

Biology - Skra Tugant  
" - Jane Taylor

A Rothman

BIOLOGY 101  
SUGGESTED LEARNING SCHEDULE  
FALL 1987

8/31	Introduction
9/7	Labor Day
9/14	1-4
9/21	5-9
9/28	EXAM I (1-9) 10-13
10/5	14-18
10/12	19-22
10/19	EXAM II (10-22) 23-25
10/26	26-30
11/2	31-35
11/9	EXAM III (23-25) 36
11/16	37-39
11/23	40-42
11/30	EXAM IV (36-42) 43-45
12/7	46-49
12/14	EXAM V

self quiz questions

→ short answer type.

content brief  
" in detail

student questions

Chapter Summary

- 1<sup>st</sup> sentence of each paragraph
- picture/figure captions

EVALUATION POLICY

The final grade will be based on 5 <sup>exams</sup> quizzes and active participation in class discussion.

The breakdown is:

- 75% earned from quiz scores
- 25% earned from active participation.

Grading Scheme:  $>.93 = A$ ;  $>.83 = B$ ;  $>.65 = C$

PLEASE NOTE: There will be NO make up quizzes.

55

104  
42  
(57)

BIOL 101

NAME

JOSEPH BUSTILLOS

TEST NO.

DATE

28 Sept. 1987

1-I. Matching. Choose the most appropriate answer to match with each of the following terms:

C cell

B organelle

A subatomic particle

A a proton, neutron, or electron.

B a well-defined structure within a cell, performing a particular function.

C the smallest unit of life.

1-II. Fill-in-the-Blanks.

In humans, lipids <sup>-fats</sup> serves as the main long-term storehouse of energy, and ~~proteins~~ <sup>sugars</sup> is used as a more immediate energy source to do metabolic work.

1-III. True-False.

F From an evolutionary point of view, the populations that are likely to survive the longest have the fewest variations.

1-IV. True-False.

F There are more different species of organisms associated with a tropical reef than there are living off the coast of Greenland because the mutation rate is much higher in the coral reef ecosystem.

1-V. Matching. Choose the one most appropriate answer for each.

B consumer

C decomposer

A producer

A traps solar energy in its tissues.

B organism that eats other organisms.

C organism that breaks down the tissues of other organisms and releases the raw materials contained therein.

2-II. Fill-in-the-Blanks.

The theory of inheritance of acquired characteristics is primarily linked with the name of LAMARCK.

Buffon believed that there had been several "centers of creation," that the origin of species had been spread out geographically, and that species might have become changed through time.

2-IV. True-False.

F Phylogenetic classification is a process by which organisms inherit acquired characteristics.

T Modern classification systems try to categorize organisms phylogenetically whenever the necessary background information is available.

T All prokaryotes are monerans.

3-I. Matching.

C atom

B atomic number

D electron

A ion

E isotope

~~A.~~ a charged atom.

~~B.~~ the number of protons in the nucleus.

~~C.~~ The smallest neutral unit of an element that shows the chemical and physical properties of that element.

~~D.~~ a negatively charged subatomic particle.

~~E.~~ a form of an element, the atoms of which contain a different number of neutrons from other forms of the same element.

3-III. True-False.

- F In an atom, the volume of space that can accommodate (at most) two electrons is called an energy level.
- T When an atom absorbs energy, electrons that are part of that atom move faster and tend to spend more of their time farther from the nucleus than they did before the energy was absorbed.
- F In order for an atom to react with another atom, all orbitals of that atom must already contain two electrons.

3-IV. Fill-in-the-Blanks.

Sometimes polar molecules split; that is, they separate into two (or more) ions. Nonpolar regions of large molecules have no net charge and show little tendency to form hydrogen bonds with water; they are said to be hydrophobic (water-dreading).

4-I. Fill-in-the Blanks.

A(n) hydroxyl group contains an oxygen atom and a hydrogen atom. A(n) hydrocarbonate group contains two oxygen atoms, a carbon atom, and a hydrogen atom.

4-II. Matching. Match all applicable letters with the appropriate terms. A Blank may contain more than one letter.

- |                    |   |
|--------------------|---|
| <u>D</u> cellulose | A. monosaccharide                                       |
| <u>EH</u> glycogen | B. disaccharide   |
| <u>GF</u> sucrose  | C. polysaccharide                                       |
|                    | <u>D</u> used as a structural support                   |
|                    | <u>E</u> used as a food reserve                         |
|                    | <u>F</u> table sugar                                    |
|                    | <u>G</u> milk sugar                                     |
|                    | <u>H</u> used in brewing and found in germinating seeds |
|                    | I. a five-carbon sugar                                  |

4-III. F A polyunsaturated fat is usually an oil at room temperature and generally contains many double bonds in the fatty acid component.

4-IV.

True-False.

- F Amino acids are linked together by hydrolysis, a process that splits out molecules of water as the amino acid subunits are linked together.
- T Bone and cartilage are constructed, in part, of specific proteins.
- T R groups projecting from the main carbon skeleton determine how a long-chain protein will interact chemically with other substances.
- F The primary structure of a protein is formed principally by hydrogen bonds linking various amino acids.
- F An amino group contains a nitrogen atom and two hydrogen atoms; a carboxyl group contains two oxygen atoms, a carbon atom, and a hydrogen atom.

5-II.

Matching. Select the single best answer. A letter may be used more than once.

- |                                |   |
|--------------------------------|---|
| <u>F</u> endoplasmic reticulum | A. photosynthesis occurs here.                                    |
| <u>B</u> Golgi complex         | <u>B</u> digestion and disposal.                                  |
| <u>C</u> lysosomes             | <u>C</u> energy extraction.                                       |
| <u>D</u> microbodies           | D. material synthesis, modification, and distribution.            |
| <u>C</u> mitochondria          | <u>E</u> hereditary instructions for synthesis and cell operation |
| <u>E</u> nucleus               | <u>F</u> material conversions and disposal.                       |

5-III. Fill-in-the-Blanks.

The ~~endoplasmic reticulum~~ is the region where ribosomal subunits are synthesized. Masses of DNA and its associated proteins that extend throughout the nucleoplasm when it is not undergoing division are called ~~nucleus~~.

During cell division this material condenses into chromosomes.

5-VII. True-False.

- F Some cells can live if they contain only a plasma membrane, DNA molecules, and cytoplasm that lacks other cell structures.

6-II.

Fill-in-the-Blanks.

water, oxygen, hydrogen, a few other simple molecules, and some lipids diffuse readily across plasma membranes. Diffusion is driven by the level solute gradient inherent in all individual molecules as they move from a region of high concentration to a region of lower concentration. In passive transport, different ions and molecules present in a fluid move together in the same direction, often in response to a pressure gradient.

The plasma membrane is select permeable; some molecules travel rapidly across the membrane, others cross it more slowly; and some are kept from crossing it at all. water is one of the few molecules that can move freely into and out of the cell.

7-II.

Matching. Match the most appropriate letter to its number.

- |                                   |  |
|-----------------------------------|--|
| <del>F</del> coupling agent       | <del>A</del> ratio of product concentration to reactant molecule concentration |
| <del>A</del> dynamic equilibrium  | <del>B</del> reaction showing a net loss in energy.                            |
| <del>D</del> endergonic           | <del>C</del> ATP and NADP <sup>+</sup> mainly.                                 |
| <del>B</del> equilibrium constant | <del>D</del> rate of forward reaction = rate of reverse reaction.              |
| <del>E</del> exergonic            | <del>E</del> compound traveling through a series of chemical reactions.        |
| <del>C</del> metabolite           | <del>F</del> reactants show a net gain in energy.                              |

7-IV.

True-False.

- ~~F~~ In order for two reactant molecules to become product molecules, the reactant molecules must first collide with sufficient minimum energy.
- ~~T~~ The appropriate enzyme lowers the amount of energy that must be supplied to enable the reactants to be converted to products; it also lowers the amount of energy required by the reverse reaction.

True-False.

- F A substance that has been oxidized has gained one or more electrons.
- T Phosphorylation is a chemical reaction in which a phosphate group is attached to another molecule, thus increasing the potential chemical energy of that molecule.

8-I.

Fill-in-the-Blanks.

Photosynthetic autotrophs include all plants, some protists, and some monera. Chemosynthetic autotrophs are limited to a few kinds of ~~monera~~.

8-II.

Fill-in-the-Blanks.

Light-trapping proteins are called ~~plastids~~; one of these is called ~~chloroplast~~, which absorbs blue and red wavelengths but transmits green.

8-IV.

The light-independent reactions can proceed without sunlight as long as ~~air~~ and ~~nutrients~~ are available. The reactions begin when an enzyme links ~~simple sugar~~ to ~~a~~ phosphate, a five-carbon compound.

8-V.

Fill-in-the-Blanks.

Chemosynthetic bacteria are autotrophs, for they can live completely on an ~~nutrient~~ diet.

9-III.

True-False.

- F Glucose is the only carbon-containing molecule that can be fed into the glycolytic pathway.
- T Carbon dioxide and water, the products of aerobic respiration, generally get into the blood and are carried to gills or lungs, kidneys, and skin, where they are expelled from the animal's body.

9-IV.

True-False.

- F Energy is recycled along with materials.
- F The first forms of life on Earth were most probably photosynthetic eukaryotes.
- T Photosynthesis produces molecular oxygen as a by-product.

T-1-6. What is metabolic activity?

The ability to convert, store, tear down  
use ~~some~~ molecular energy

T-2-8. How are organisms grouped in the Whittaker system?

on the basis of evolutionary predecessor - groups  
w/ a more recent common ancestor are more  
closely grouped, eg, Primates & Hominids

T-3-4. Atoms of chemically nonreactive elements have zero  
electrons in their outer orbit.

T-4-7. What is a polypeptide?

~~A complex protein molecule~~

T-5-3. Give an example of a cell which can be seen with the  
unaided eye.

~~Giraffe ~~nerve~~ nerve cell~~

T-6-6. What is osmosis?

passive diffusion of a <sup>solvent</sup> solute from a higher level  
of concentration to a lower level of concentration  
across a selectively permeable membrane

T-7-2. Explain how living things do not violate the Second Law  
of Thermodynamics.

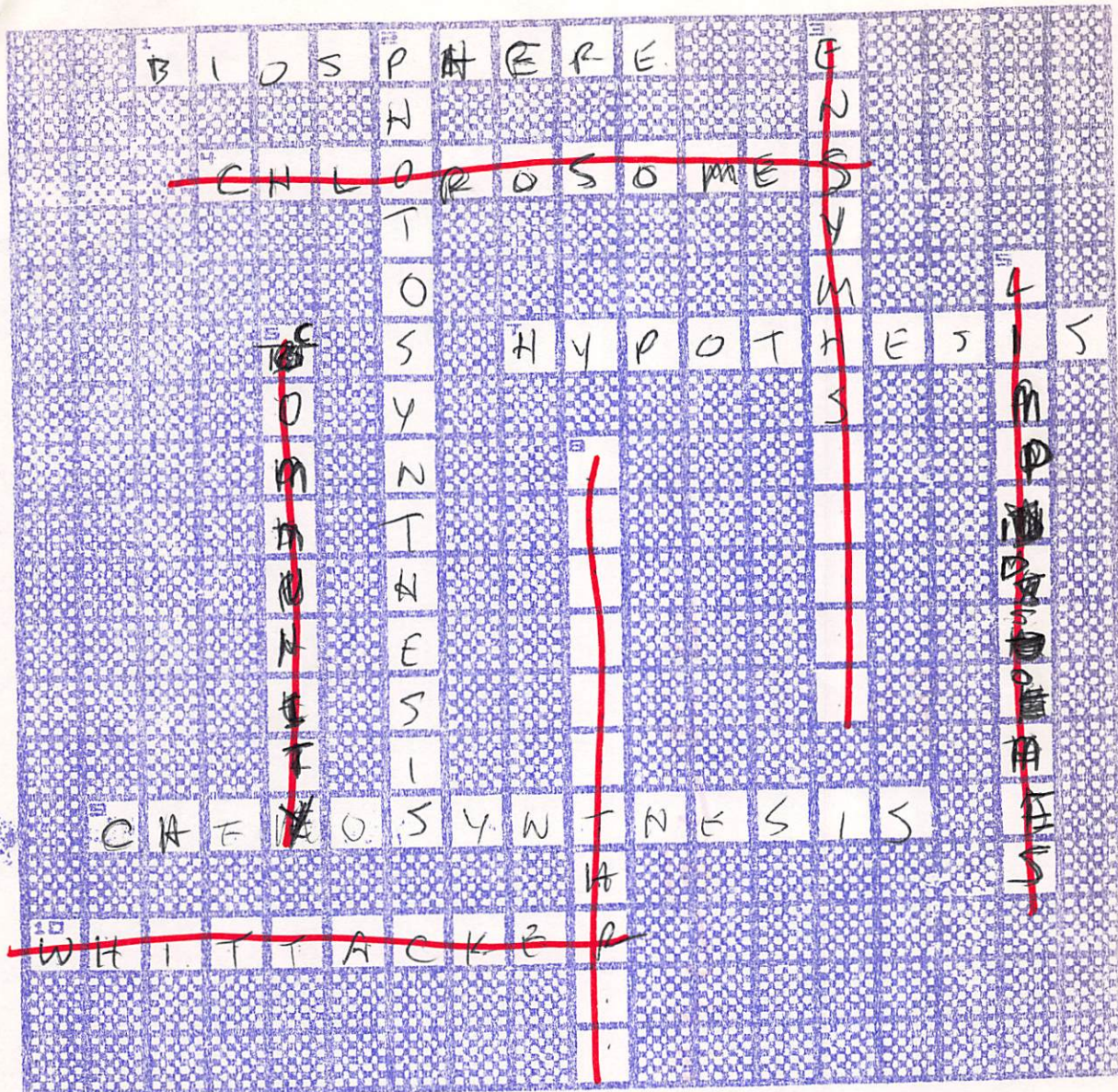
Energy to metabolize is a lesser quality  
from is a by-product. When the living organism  
can no longer metabolize it too is broken down &  
a less quality energy is released.

T-8-3. What is the product of photolysis?

~~CO<sub>2</sub>~~ ~~carbon dioxide~~

T-9-2. Which pathway of carbohydrate metabolism occurs in cytoplasm?

~~respiration~~



ACROSS CLUES

1. The regions on earth that support self sustaining and self regulating ecological systems.
4. The organelle in which photosynthesis occurs.
7. An educated guess.
9. Harnessing energy released from oxidation of inorganic substances.
10. Corresponding in structure and evolutionary origin.

DOWN CLUES

2. The principle energy trapping pathway used by photoautotrophs.
3. An organelle that releases ninety percent of the energy stored in glucose.
5. Vesicles of extracellular fluid are brought into the cell by bulk transport.
6. A biological community interacting with its nonliving environment.
8. A state of physiological equilibrium, by a balance of function and composition.

PHYLOGENETIC INHERITANCE  
WHITTAKER

Biosphere  
CHLOROPLAST

6

VESICLES

COMMUNITY  
POPULATION  
BIOSPHERE



10-III. Choose the one most appropriate answer for each.

- |                      |                      |  |
|----------------------|----------------------|--|
| <u><del>GI</del></u> | anaphase             | <input checked="" type="checkbox"/> A) first phase of protein synthesis                                  |
| <u>H</u>             | chromatid            | <input checked="" type="checkbox"/> B) cytoplasm allotted to and divided between two nuclei              |
| <u>B</u>             | cytokinesis          | <input checked="" type="checkbox"/> C) chromosomes condense; mitotic spindle starts to form.             |
| <u>A</u>             | G <sub>1</sub> phase | <input type="checkbox"/> D) cytokinesis occurs now   |
| <u>G</u>             | G <sub>2</sub> phase | <input checked="" type="checkbox"/> E) final phase of mitosis  |
| <u>J</u>             | metaphase            | <input checked="" type="checkbox"/> F) connects two sister chromatids                                    |
| <u>C</u>             | prophase             | <input checked="" type="checkbox"/> G) second phase of protein building                                  |
| <u>D</u>             | S phase              | <input checked="" type="checkbox"/> H) elongate half of a chromosome                                     |
| <u>E</u>             | telophase            | <input checked="" type="checkbox"/> I) sister chromatids separate and move to opposite spindle poles now |
| <u>F</u>             | centromere           | <input checked="" type="checkbox"/> J) chromosomes lined up along equator pole                           |

11-II. Sequence. Arrange the following entities in correct order of development, putting a 1 by the stage that appears first and a 5 by the stage that finishes the process of spermatogenesis.

- 2 primary spermatocyte  
5 sperm  
4 spermatid  
1 spermatogonium  
3 secondary spermatocyte

11-II. True-False.

- T All cells in you are diploid except for any gametes you may produce.

12-II. In heterozygous individuals, \_\_\_\_\_.

D

- a) the expression of one allele may mask the expression of the other for any given trait.
- b) both alleles for a given trait retain their identity throughout the individual's life cycle.
- c) if one allele masks the expression of the other, the former allele is dominant and the latter is recessive.
- d) all of the above are correct.

12-II. When independent assortment of alleles does occur, \_\_\_\_\_.

A

- a) the alleles that code for the differing traits of an individual are parceled out independently of one another into separate gametes.
- b) the process of meiosis retains the diploid number of chromosomes.
- c) the alleles that code for a single trait are parceled out into the same gamete.
- d) both a and c are correct.

12-II. A true-breeding red-flowered, tall plant is crossed with a true-breeding dwarfed, white-flowered plant. When two of the resulting  $F_1$  plants are crossed, the phenotypic ratio in the  $F_2$  offspring is approximately a \_\_\_\_\_ ratio. Red flowers and tall plants are dominant.

D

- a) 1:1:1:1    b) 1:2:1    c) 1:3:1    d) 9:3:3:1.

12-II. In genetics, the symbol for the dominant allele is usually the first letter of the trait, capitalized. The symbol for the recessive allele is \_\_\_\_\_.

C

- a) the first letter of the recessive trait, capitalized.
- b) the first letter of the recessive trait, in lower case.
- c) the first letter of the dominant trait, in lower case.
- d) none of the above.

12-III. True-False.

T If a true-breeding red-flowered snapdragon is crossed with a white-flowered snapdragon, all of the  $F_1$  generation will be red-flowered.

12-III. True-False.

F Hemophilia is an example of a disorder caused by incomplete dominance.

12-III. True-False.

F A child of blood type AB has a mother with type A blood. The child's father could have type O.

13-II. Most animal and some plant species have sex chromosomes that \_\_\_\_\_.

C

- a) are called autosomes.
- b) always consists of one X and one Y.
- c) differ in number or in kind between males and females.
- d) all of the above are correct.

13-II. Normally, all eggs from a human female contain \_\_\_\_\_.

A

- a) one X chromosome
- b) one Y chromosome
- c) one X chromosome and one Y chromosome.
- d) only autosomes.

13-III. In the first stage of meiosis, two sister chromatids of one chromosome are drawn into a locus-by-locus alignment with the two sister chromatids of its homologue. This process of alignment and attachment is called \_\_\_\_\_.

C

- a) crossing over
- b) linkage
- c) synapsis
- d) polygenic inheritance.

13-III. \_\_\_\_\_ is a consequence of crossing over.

D

- a) dihybrid cross
- b) linkage
- c) dependent assortment
- d) genetic recombination.

13-III. The closer together two genes are on one chromosome,

A

- a) the fewer times there will be crossing over and genetic recombination occurring between them.
- b) the more times there will be crossing over and genetic recombination occurring between them.
- c) the farther apart they will appear in a linkage group.
- d) the greater the chance will be that point mutations will happen to either of them.

13-III. Genetic recombination occurs as a result of crossing over between nonsister chromatids of homologous chromosomes during \_\_\_\_\_.

B

- a) metaphase of mitosis
- b) prophase I of meiosis
- c) syngamy (fusion of gametes)
- d) prophase II of meiosis

13-III. Plotting the positions of genes on chromosomes according to their segregation patterns during meiosis is called \_\_\_\_\_.

A

- a) linkage mapping      b) karyotyping      c) G-banding
- d) transposing

13-III. A standard map unit is \_\_\_\_\_.

D

- a) ten crossovers per 100 bands.
- b) one crossover per 100 gametes.
- c) 1 mm between the closest G-bands.
- d) a 1 percent frequency of recombination between the genes involved.

14-I.

Matching.

Choose the single most appropriate letter.

C

Down's syndrome

a) autosomal recessive inheritance

A

hemophilia

b) sex-linked recessive inheritance

B

Turner's syndrome

c) nondisjunctive inheritance

14-II. Matching. Choose the most appropriate answer for each.

- |                           |  |
|---------------------------|--|
| <u>G</u> .diabetes        | a) females with only one X chromosome, ovaries nonfunctional.  |
| <u>E</u> .galactosemia    | b) XXY-sterile males with breast enlargement   |
| <u>B</u> trisomic XXY     | c) trisomy 21-mental retardation; large misshapen head.  |
| <u>F</u> .phenylketonuria | d) blood fails to clot; Queen Victoria was a carrier.  |
|                           | e) person should be placed on a milk-free diet if afflicted with this.   |
|                           | <del>f)</del> mutant allele codes for a defective enzyme; a toxic substance in the blood damages the nervous system. |
|                           | <del>g)</del> too little sugar in the cells; too much in the blood.  |
|                           | h) a diagnostic technique that samples uterine fluid.  |

15-I. True-False.

- F  $^{35}\text{S}$  can be used to label DNA, and  $^{32}\text{P}$  can be used to label almost any protein.

15-I. True-False.

- F DNA is the only hereditary molecule found in viruses.

15-I. True-False.

- F Bacteriophages are bacteria that eat viruses.

15-II. True-false.

- F Each nucleotide consists of a six-carbon sugar, a phosphate group, and a nitrogen-containing base.

15-II. True-False.

T DNA is composed of only four different types of nucleotides, each of which contains adenine, thymine, cytosine, or guanine.

15-II. True-False.

T In every species, the amount of adenine present always equals the amount of thymine, and the amount of cytosine always equals the amounts of guanine (A = T, and C = G).

15-II. True-False.

F In a nucleotide, the phosphate group is attached to the nitrogen-containing base, which is attached to the five-carbon sugar.

15-III. True-False.

F The replication of DNA is considered semiconservative because the same four nucleotides are used again and again during replication.

16-I. Fill-in-the-Blanks.

Today we know that RNA molecules serve as the message carriers. Unlike DNA, RNA contains ribose instead of deoxyribose, and, in place of the base thymine, it has uracine, which can form hydrogen bonds with the purine uracine.

16-IV. Fill-in-the-Blanks.

A(n) codon is a triplet on mRNA that forms hydrogen bonds with a(n) anti codon, which is a triplet on tRNA.

19-I.

Fill-in-the-Blanks.

~~meristem~~ is ground tissue that lies between the vascular ring and the dermal surface layer of plant stems and roots. The main photosynthetic area of a leaf is composed of ~~pigments~~ which lies between the leaf's upper and lower ~~surfaces~~.

19-II.

Fill-in-the-Blanks.

Vascular tissues consist of primary xylem, which conducts water and ions from the roots to the photosynthetic areas, and primary phloem, which conducts the products of photosynthesis away to storage areas and helps support the plant.

19-IV.

Fill-in-the-Blanks.

Most leaves absorb ~~water~~, take up carbon dioxide from the air, and use ~~nutrients~~ delivered by the xylem in carrying out the complex series of chemical reactions.

19-VI.

Fill-in-the-Blanks.

Growth rings are produced by fluctuating levels of activity in the vascular cambium.

20-I.

Matching. Choose at least one and no more than two letters per blank.

- |                           |            |  |
|---------------------------|------------|--|
| <u>A</u> <del>I</del>     | calcium    | a) macronutrient   |
| <del>A</del> <del>H</del> | copper     | b) micronutrient   |
| <u>B</u> <del>F</del>     | iron       | c) component   |
| <del>C</del>              | magnesium  | <del>d)</del> at center of chlorophyll molecule  |
| <del>E</del>              | manganese  | <del>e)</del> helps to establish osmotic gradients; as CO <sub>2</sub> dwindles in guard cells, this is pumped in. |
| <del>E</del>              | nitrogen   | <del>f)</del> part of a coenzyme needed in enzyme-mediated reactions that reduce nitrate.                          |
| <del>D</del>              | phosphorus | <del>g)</del> in ammonium, nitrate, and nitrite ions; needed for protein and nucleotide synthesis.                 |
| <del>E</del>              | sulfur     | <del>h)</del> involved in electron transport during photosynthesis and aerobic respiration.                        |
|                           |            | <del>i)</del> needed in cell walls, in cell growth, and in cell division.  |

21-II.

Matching.

- |              |                 |  |
|--------------|-----------------|--|
| <del>A</del> | carpel          | <del>a)</del> a tiny opening through the integuments                 |
| <del>E</del> | generative cell | <del>b)</del> will become a seed, especially if fertilization occurs |
| <del>B</del> | micropyle       | <del>c)</del> female sex organs                                      |
| <del>F</del> | microspore      | <del>d)</del> male sex organs  |
|              | mother cell     | <del>e)</del> undergo meiosis  |
| <del>C</del> | ovule           | <del>f)</del> will divide mitotically to form two sperm nuclei       |
| <del>G</del> | pollen grain    | <del>g)</del> immature male gametophyte                              |
| <u>D</u>     | stamen          |  |

22-II.

Identification.

Promote stem elongation (especially in dwarf plants); might help break dormancy of seeds and buds.

X  
Arbitrary designation for as yet unidentified hormone (or hormones) thought to cause flowering.

Promote cell elongation in coleoptiles and stems; long thought to be involved in phototropism and gravitropism.

night  
Promotes stomatal closure; might trigger bud dormancy, seed dormancy, and abscission of leaves, flowers, and fruits.

spring  
Promotes fruit ripening; promotes abscission of leaves, flowers, and fruits.

Promote cell division; promote leaf expansion, and retard leaf aging.

T-10-7. When does mitosis take place in the cell cycle?

?  
during after interphase in the parent cell & before interface in the daughter cell - when the genetic material is being dividing into two cells.

T-11-8. What is the significance of crossing over?

Provides for genetic recombination, allows for variety of sexually reproduced organisms.

T-12-1. State the Mendelian principle of segregation.

Each organism has one from each parent which are recessive or dominant & are distributed.

T-15-2. What is a bacteriophage?

~~It is the genetic material of a ~~bacteriophage~~ bacteriophage~~

T-16-6. What is a codon?

is a triplet on mRNA that forms hydrogen bonds w/ anti codon

T-19-1. Define meristem.

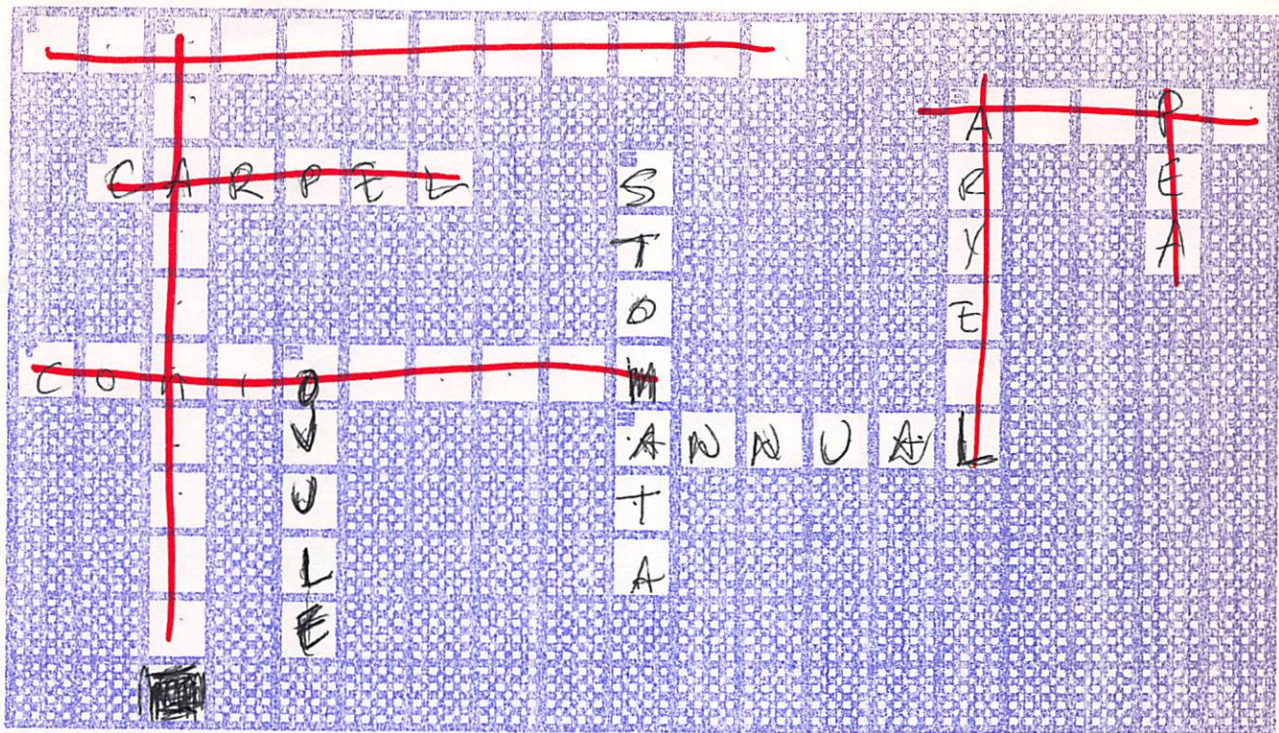
T-20-4. Define mycorrhiza.

T-21-2. Distinguish between pollination and fertilization.

Pollination is the transport & phase of dispersing the pollen grains. Fertilization is the process where the egg cell is impregnated by the sperm cell & cell division commences.

T-22-5. Define tropism.

~~A propensity for an environmental condition to influence a biological process~~



#### ACROSS CLUES

1. Not vegetative.
2. A class of plant growth hormones.
3. Ground tissue located between the vascular ring and the dermal surface.
7. Chiefly conifers in this group.
9. A plant that lives for one growing season.

#### DOWN CLUES

1. Gives rise to vascular tissue.
3. Of, or related to the apex.
4. The most widely encountered auxin.
6. Gates across the epidermis of leaves and stems.
8. A multicellular organ that produces eggs.

angiosperms  
gymno

BIOL. 101  
Nov. 9, 1987

EXAM III

NAME

Joe Bustillo

True-False

23-II

I

Mammalian skin contains squamous epithelium.

23-V The midsagittal plane divides the body into right and left halves; the transverse plane divides the body into anterior (front) and posterior (back) parts.

23-VI interstitial fluid fills the spaces between cells and tissues in vertebrates. Bernard discovered that the ~~kidney~~ absorbs many of the nutrients carried to it by blood and converts them into complex storage forms.

24-I ~~microglia~~ cells, which support and nurture the activities of neurons, make up about half the volume of the nervous system.

24-II A plasma membrane is selectively permeable.

24-III Alterations in the electrical gradient across the membrane constitute the impulse that travels over a neuronal membrane surface.

24-III A(n) action potential is an all-or-nothing, brief reversal in membrane potential; it is also known as a(n) nerve impulse.

24-IV. The junction specialized for transmission between a neuron and another cell is called a neurosynch.

25-IV. Matching

- |                                |  |
|--------------------------------|--|
| <u>B</u> Broca's area          | X. monitors visceral activities; influences behaviors related to thirst, hunger, reproductive cycles and temperature control.      |
| <del>F</del> cerebellum        | X. coordinates muscles required for speech   |
| <u>D</u> corpus callosum       | X. relays and coordinates sensory signals to and from the cerebrum   |
| <u>A</u> hypothalamus          | X. broad channel of white matter that keeps the two cerebral hemispheres communicating with each other.                            |
| <del>C</del> medulla oblongata | X. coordinates nerve signals for maintaining balance, posture, and refined limb movements.   |
| <del>E</del> thalamus          | X. connects pons and spinal cord; contains reflex centers involved in respiration, stomach secretion, and cardiovascular function. |

26-V. Matching

- |                       |  |
|-----------------------|--|
| <u>E</u> ACTH         | X. essential for sperm production; secreted by gonad.  |
| <u>B</u> epinephrine  | X. increases heart rate and force of contraction; the main emergency hormone.                                      |
| <u>C</u> estrogen     | X. produced by gonad; essential for egg maturation and maintenance of secondary sex characteristics in the female. |
| <u>D</u> insulin      | X. lowers blood sugar by encouraging cells to take in glucose; responsible for protein synthesis and fat storage.  |
| <u>A</u> testosterone | X. stimulates adrenal cortex to secrete hormones involved in responses to stress                                   |
| <u>F</u> thyroxine    | X. influences overall metabolic rate, growth and development, and sensitivity to temperature extremes.             |

27-I. Cells (or parts of cells) that detect specific kinds of stimuli are neurons. A potential is any form of energy change in the environment that the body actually detects. chemoreceptors detect impinging chemical energy; mechanoreceptors detect mechanical energy associated with changes in pressure, position, or acceleration; photoreceptors detect the energy of visible and ultraviolet light; thermoreceptors detect radiant energy associated with temperature changes; chemoreceptors sampling odors from food in the mouth are important for our sense of taste.

28-I. All motor systems are based on effector cells that are able to contract and relax, and on the presence of a medium against which the mechanical force may be applied. Longitudinal and circular muscle layers work as an antagonistic muscle system, in which the action of one motor element opposes the action of another. A membrane filled with fluid resists compression and can act as a fluid skeleton.

29-I. Blood is a highly specialized fluid connective tissue that helps stabilize internal pH and equalize internal temperature throughout an animal's body. Organisms with closed circulation systems generally also have a supplementary lymphatic vascular system that recovers and purifies interstitial fluid and returns it to the major blood vessels.

29-IV. Bleeding is stopped by several mechanisms that are referred to as coagulation; the mechanisms include blood vessel spasm,

\_\_\_\_\_ Fibrin, and blood platelets.

29-V. lymph vessels reclaim fluid lost from the bloodstream, purify the blood of microorganisms, and transport fat from the small intestine to the bloodstream.

30-I. Among single-celled organisms, phagocytosis was a means of ingesting food that probably proved adaptive in defense. The turned-on B cells controls the production of surface markers that identify specific nucleated cells.

30-III. Matching:

D allergy

E antibody

B antigen

C macrophage

A plasma cell

A Y-shaped immunoglobulin

B a nonself marker

C the progeny of turned-on B cells

D an altered secondary immune response to a substance that is normally harmless to other people

E principal perpetrator of phagocytosis.

31-I. A lung is an outfolded, thin, moist membrane endowed with blood vessels. Insects have trachea: chitin-lined air tubes leading from the body surface to the interior.

31-II. During inhalation, the diaphragm moves downward and flattens, and the chest cavity moves outward and upward.

31-III. Without red blood cells, the plasma would be able to carry only about 2 percent of the oxygen that whole blood carries. When oxygen-rich blood reaches a damaged tissue capillary bed, oxygen diffuses outward, and carbon dioxide moves from tissues into the capillaries. Clusters of cells in the chest cavity and diaphragm regulate contractions of the diaphragm and intercostal muscles associated with inhalation and exhalation.

32-I. Digestion includes taking food into the digestive tract, breaking it down, and transporting the broken-down food into the circulatory system and thence into cells. Swallow is the term for taking food into the digestive tract, but pharynx means breaking the food down into its simplest components.

32-II. True-False

- T Amylase digests starch, lipase digests lipids, and proteases break peptide bonds.
- F Vitamin K is synthesized in the small intestine and is important in the formation of a blood clot.
- F Water and minerals are absorbed into the bloodstream from the lumen of the large intestine.

32-III. A deficiency of vitamin D produces rickets in children and osteomalacia in adults. A deficiency of ~~iron~~ promotes pellagra, a disease characterized by sores on the skin and gut wall and nervous and mental disorders.

33-II. True-False

- T All animals must regulate individual ion concentrations in the body.
- ~~F~~ Water reabsorption into capillaries is achieved by active transport.
- T When the body rids itself of excess water, urine is highly dilute.
- ~~T~~ Of the three principal waste products excreted from the human urinary bladder, uric acid is generally most toxic.

33-III. The ~~lymph~~ contains a nerve cell cluster that is sensitive to concentrations of sodium and some other solutes in blood; it also contains a ~~nerve~~ center that detects a rise in salt levels (or a drop in water volume).

34-II. True-False.

- F Maternal messages consist principally of extra amounts from the mother that are included in the cytoplasm of the newly formed egg.

34-IV. If a zygote is split, either naturally or experimentally, into two equal parts, the result is identical twins.

~~zygosis~~ involves the growth, shaping, and spatial coordination necessary to form functional body units. Embryonic cells move in response to adhesive cues and ~~hormonal levels~~.

OK

35-I. Spermatogenesis occurs in the ~~male~~ testes, but sperms become somewhat motile in the testes of the male. The interstitial cells of the testis produce sperm. A cap over most of the head of each sperm contains ~~antibody~~ that function in egg penetration.

35-II. Ovaries produce the important sex hormones estrogen and ~~testosterone~~ in the female fallopian tubes are passageways that channel ova from the ovary into the uterus, which houses the embryo during pregnancy.

T-23-1 Define animal tissue.

like cells that have a similar purpose

T-24-2 What is the difference between a neuron and a nerve?

a nerve is a bundle of neurons

T-25-4 What constitutes the central nervous system?

central nervous system is the spinal cord & the brain

T-26-8 Which hormone secreted by the anterior pituitary has a direct effect on most body cells?

~~growth~~ growth hormone

T-27-3 Give an example of a mechanoreceptor.

~~Finger tip~~ Finger tip - sense of touch

T-28-2 Distinguish between axial and appendicular skeleton in humans.

appendicular skeleton are related to the limbs the plexic girdle & the skull block structure. The Axial skeleton relates to the skull, the spinal column & the rib cage

T-29-4 Distinguish between open and closed circulatory systems.

~~insects have closed circulatory systems,~~  
amphibians have open systems

T-30-4 What is a vaccine?

A vaccine is a small virus used to promote antibodies to ~~the~~ battle the virus

T-31-3 Distinguish between respiration and breathing.

respiration is gas exchange & breathing is the mechanical movement of respiration

T-32-5 Name one hormone that works in the digestive tract.

~~ACTH~~

T-33-1 Distinguish between ectotherm and endotherm.

ectotherm is an organism that is dependent on environmental conditions & behavioral patterns to regulation <sup>respiration</sup> metabolism & body temperature. Endotherms maintain body temperature through metabolism

T-34-4 Distinguish among ecto, meso, and endoderm.

Ectoderm is the outer layer of the skin, ~~mesoderm~~ mesoderm is the middle level & endoderm is the deepest level - internal level.

T-35-2 Name one accessory reproductive gland.

~~prostate gland~~

3-22-1 name one necessary reference group

(one)

3-22-2 distinguish among some of the following

3-22-3 distinguish between the following

3-22-4 name one person who works in the following

3-22-5 distinguish between the following

3-22-6 name one person who works in the following

3-22-7 distinguish between the following

3-22-8 distinguish between the following

100  
42  
58

6

8

42

Dec 14

27

22

5

33

NAME: JE BUSTILLOS

+58

36-I. Fill-in-the-Blanks.

A(n) population is a group of individuals of the same species that occupies a given area at a specific time.

The ~~Hardy-Weinberg~~ rule allows researchers to establish a theoretical reference point (baseline) against which changes in allele frequency can be measured.

Variation can be expressed in terms of ~~Genetic~~ Diversity

- the relative abundance of different alleles carried by the individuals in that population. The stability of allele ratios that would occur if all individuals had equal probability of surviving and reproducing is

called ~~Population~~ Equilibrium.

36-II. Fill-in-the-Blanks.

~~Genetic~~ Shift occurs when a specific change in the environment causes a heritable trait to occur with increasing frequency, and the whole population tends to shift in a parallel direction. ~~Genetic~~ Diversity

favors the development of two or more distinct polymorphic varieties such that they become increasingly represented in a population, and the population is split up into different phenotypic variations. ~~Horse~~ Crab

provide an excellent example of stabilizing selection because they have existed essentially unchanged for 400 million years. Because deaths of HbA homozygotes due to malaria were balanced by deaths of HbS homozygotes

brought about by sickle-cell anemia, ~~adaptive radiation~~  
at the sickle-cell locus was maintained in populations  
in regions where malaria was prevalent. Populations in  
which two or more forms of a trait persist are said to  
show ~~mutational~~ at that gene locus. When individuals  
of different in their ability to survive and reproduce,  
their alleles are subject to \_\_\_\_\_.

36-III. Fill-in-the-blanks.

~~population~~ speciation, the most common pattern in  
nature, occurs when geographic separation of two  
populations, accompanied by gradual divergent evolution  
between them, leads to reproductive isolation. Especially  
among plants, ~~crossbreed~~ and hybridization are two other  
speciation routes; about 40 percent of all flowering  
plants are \_\_\_\_\_.

37-I. Evolution can be viewed either by the ~~gradualistic~~ model,

which envisions speciation as accounting for only a  
small amount of large-scale change in the manner of  
~~gradual~~ evolution, or by the ~~punctualistic~~ model,  
which sees higher taxa originating from the rapid  
crossing of adaptive thresholds. The ~~proterozoic~~ era  
extended from 2.5 billion years ago to about 570 million  
years ago; initially heterotrophic and autotrophic  
~~prokaryotic~~ ~~organisms~~ existed, but between 900 and 750 million  
years ago \_\_\_\_\_ had appeared. The ~~archozoic~~  
era was characterized by "ancient life," with invertebrates,  
fishes, and amphibians coexisting principally with aquatic  
plants. As environments change, ~~selection~~ pressures also

- 3 -

change, and so populations change in character. If subgroups of one original population that have been living separated for many generations can no longer interbreed when brought back together, speciation is said to have occurred. The classification scheme known as cladistics depicts relatedness only in terms of branch points in the lines of descent.

37-II. Fill-in-the-blanks.

Throughout the Mesozoic era (when dinosaurs thrived) low diversity persisted, but was followed by rapid appearance and evolution of many different placental mammals from 65 to 53 million years ago. Continental movement and substantial climatic change may have caused the late permian mass extinction about 220 million years ago. Collision with a(n) astroid may have brought about dinosaur extinction during the late cretaceous period.

Cretaceous

38-I. Rain fell; minerals were stripped from rocks, and the oceans were formed. According to Cairns-Smith, clay crystals probably were the absorbing agents that served to assemble amino acids into proteins. \_\_\_\_\_ are differentially permeable assemblages of polypeptides that accumulated greater concentrations of certain substances within them than were found on the outside. liposomes are microscopic spherical and tubular structures that are assembled from simple lipids that have single-chain tails and hydrocarbon heads.

38-II.

Fill-in-the-Blanks.

The primitive eukaryotes were mobile; and some chased after their prey; aerobic respiration would clearly have been advantageous in providing energy sources for their movements. Mats of cells that resemble modern cyanobacteria have been found in rock formations more than 2 billion years old; these are called cyanobacteria. Desulfovibrio can carry out anaerobic as well as fermentation. The Symbiotic theory of eukaryote origins suggests that anaerobic amoeboid cells ingested aerobic bacteria that were not later digested.

38-IV.

Fill-in-the-Blanks.

At the dawn of the Cenozoic era, the supercontinent Pangea was established, and the extremely diverse multitudes of rather stable marine communities were reduced to relatively few species. On land during this era, the Gymnosperms were becoming the dominant plants, and the therapsid Archosaurs dwindled to near extinction. The ultimate challengers of the dominant animals were to be the little ratlike mammals scurrying through the scrubbery of the Jurassic and Cretaceous periods, whose populations exploded into the biotic vacuum established by the abrupt extinction of the dinosaurs at the end of the Cretaceous. In much of the world, the concurrent shifts in climate led to the emergence of extensive, semiarid, cooler environment, into which herbivores and their predators radiated.

38-II.

Fill-in-the-Blanks.

-5-

The primitive eukaryotes were mobile; and some chased after their prey; \_\_\_\_\_ respiration would clearly have been advantageous in providing energy sources for their movements. Mats of cells that resemble modern cyanobacteria have been found in rock formations more than 2 billion years old; these are called \_\_\_\_\_. Desulfovibrio can carry out \_\_\_\_\_ as well as fermentation. The \_\_\_\_\_ theory of eukaryote origins suggests that anaerobic amoeboid cells ingested aerobic bacteria that were not later digested.

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39-I.

Fill-in-the-Blanks.

~~bacterial~~ autotrophs extract energy from inorganic molecules. Two types of bacterial heterotrophs are ~~helical~~, which break down dead organisms, and ~~parasitic~~, which obtain their nutrients from a host organism.

39-II.

Fill-in-the-Blanks.

Individual viral particles are called virions; each consists of a central nucleus ~~head~~ surrounded by a capsid.

39-IV.

Matching.

- |                                   |   |
|-----------------------------------|---|
| <u>J</u> Entamoeba histolytica    | <input checked="" type="checkbox"/> A. Ciliophora                                   |
| <u>L</u> foraminiferans           | <input checked="" type="checkbox"/> B. Mastigophora                                 |
| <u>K</u> Gonyaulax                | <input checked="" type="checkbox"/> C. Rhizopoda                                    |
| <u>A</u> Paramecium               | <input checked="" type="checkbox"/> D. Sporozoa                                     |
| <u>I</u> Plasmodium               | <input checked="" type="checkbox"/> E. amoeboid protozoans                          |
| <u>B</u> Trichomonas vaginalis    | <input checked="" type="checkbox"/> F. flagellate protozoans                        |
| <u>H</u> Trypanosoma brucei       | <input checked="" type="checkbox"/> G. multicellular marine animal with no pigments |
| <del>G</del> Volvox               | <input checked="" type="checkbox"/> H. African sleeping sickness                    |
| <del>B</del> Trichoplax adhaerens | <input checked="" type="checkbox"/> I. malaria                                      |
|                                   | <input checked="" type="checkbox"/> J. traveler's diarrhea                          |
|                                   | <input checked="" type="checkbox"/> K. red tide                                     |
|                                   | <input checked="" type="checkbox"/> L. primary component of many ocean sediments    |

40-I.

Fill-in-the-Blank.

Morels, truffles, and yeasts are examples of ~~the~~ perfect fungi. Rusts, smuts, puffballs, and shelf fungi are examples of ~~perfect~~ imperfect fungi.

40-II.

Fill-in-the-Blanks.

2-7-

Lichen are composite organisms that comprise an alga and fungus living interdependently. \_\_\_\_\_ and athlete's foot are imperfect fungi that parasitize humans. penicillium is a blue mold that flavors Roquefort cheese.

40-III.

Fill-in-the-Blanks.

\_\_\_\_\_ algae resemble the blue-green algae with respect to their photosynthetic membranes and ~~chloroplasts~~ and they may have been evolutionarily derived from these.

40-V.

Fill-in-the-Blanks.

Gymnosperms and angiosperms (the flowering plants) produce seeds, each of which contains an embryo sporophyte that generally is surrounded by internal food reserves, which nourish it during germination, and by a seed shell, which guards against extreme water loss and mechanical damage. The seeds of Gymnosperms are carried on the surfaces of reproductive structures without being protected by additional layers.

~~gymnosperms~~ resemble squat palm trees that have cones instead of flowers; they also have a slow reproductive rate. ~~gymnosperms~~ are represented by a single modern species of tree with fan-shaped leaves.

41-I.

Fill-in-the-Blanks.

Ninety-seven percent of all animals on Earth are invertebrate. Multicellular animals are called \_\_\_\_\_.

sponges form the most primitive major group of multicellular animals.

41-VI.

Fill-in-the-Blanks.

- 8 -

In echinoderms, radial symmetry has been overlaid on an earlier bilateral heritage; most echinoderms still still go through a free-swimming bilateral symmetrical larval stage. A rod of stiffened tissue, the notochord, runs the length of the larval body; it was the forerunner of the chordate's backbone.

42-I.

Fill-in-the-Blanks.

Primates, like all placental mammals, apparently arose from ancestral forms of the order insectivora; representatives of this order living today are shrews, which are nighttime omnivores. Humans, apes, monkeys, and prosimians are all primates; they have excellent depth perception as a result of their forward-directed eyes, and their fingers and toes are adapted for grasping instead of running.

T-36-2.

What is a species?

an interbreeding population that occurs naturally & produces fertile offspring

T-37-4.

What factors influence the completeness of the fossil record?

The type of skeleton - hardness of the organism's body

T-38-5.

How might symbiosis have played a role in the evolution of the eukaryotes?

The development of the nucleus, chloroplasts & mitochondria might have been the result of the absorption of a small prokaryotic organism by a host cell, this specialization by another.

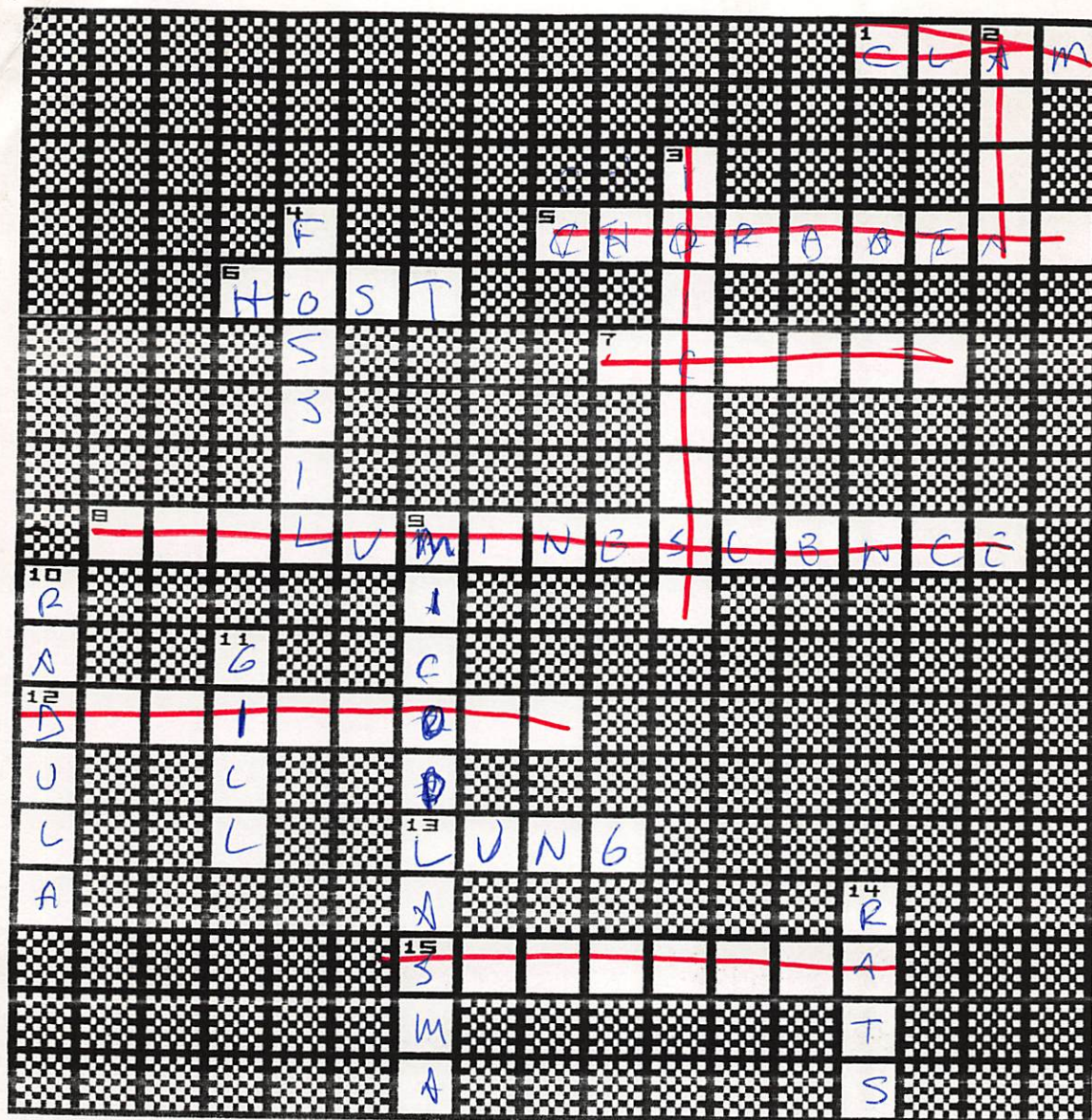
T-39-1. What characteristics distinguish bacteria from viruses?

Bacteria can metabolize apart from a host.

T-40-6. List an evolutionary trend that allowed for the invasion of land by plants.

T-41-4. What is a coelom? The layer between the ectoderm & the endoderm that houses the internal organs & is filled w/ a fluid - called the "body cavity"

T-42-3 What is a hominid? human-like, eg australopithecines, dryopithecus, human like bodies w/ ape-like heads



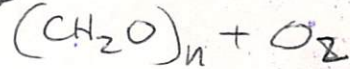
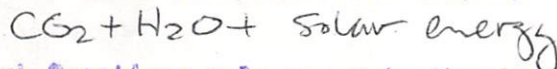
# ACROSS CLUES

1. Tiny arthropod.
5. Notochord present at sometime.
6. Provides home for parasite.
7. Treeless arctic biome.
8. A glow-worm exhibits.
12. Loses leaves.
13. Structure of air breather.
15. Helical bacteria.

# DOWN CLUES

2. \_\_\_\_\_ worms construct own house.
3. Severe kind of food poisoning.
4. Trace of an organism.
9. Smallest organism known.
10. Mollusc rasping organ.
11. Absorbs oxygen from water.
14. Rodents.

1. What is the photosynthesis equation? (3 pts)



and  
some  
H<sub>2</sub>O

2. T/F The Dark Reactions only occur in the dark. (1 pt)

3. Chlorophyll absorbs in the blue and green red region of the visible spectrum. (2 pts)

4. Circle the correct answer:

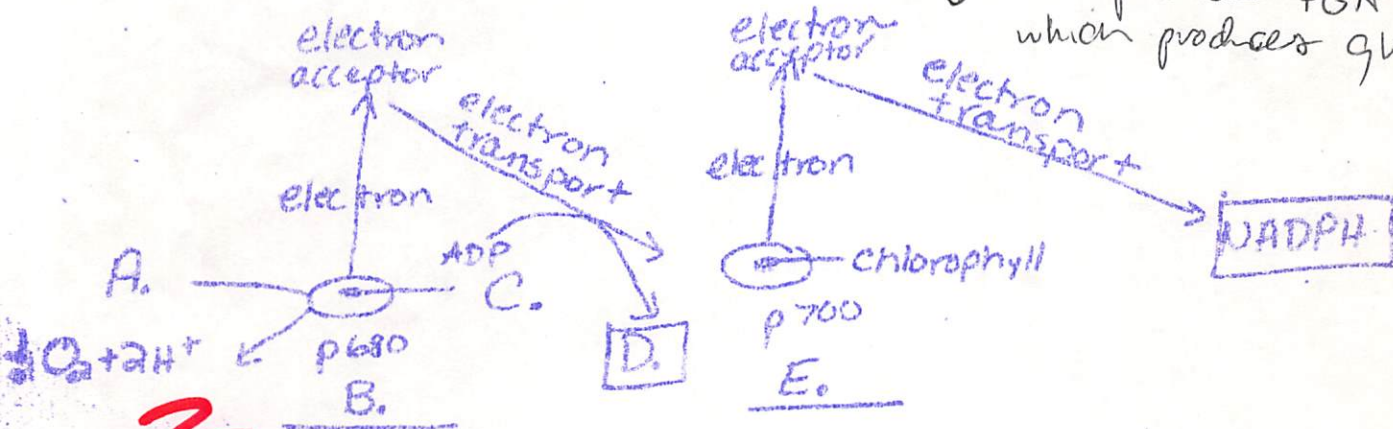
When there were high amounts of CO<sub>2</sub> present in the pond water many/few drops of NaOH were needed to titrate the sample. (1 pt)

When there were high amounts of CO<sub>2</sub> present in the pond water, the phenolphthalein dye turned the pond water pink/colorless. (1 pt)

- 7/F You would expect to find low amounts of CO<sub>2</sub> in the pond water of the Elodea which was kept in the light. (1 pt)

5. Briefly explain where the different steps of photosynthesis occur in the chloroplast. Be sure to name specific structures. (2 pts)

in the thylakoid the light reactions take place when light energy is absorbed by the plant's pigments (chloroplasts → chlorophyll a or b or carotene) taking available oxygen + hydrogen ions + producing ATP & NADPH which interact in the dark reactions (in the stroma) during the Calvin cycle to produce PGA → PGAL which produces glucose



A. H<sub>2</sub>O

B. photosystem III

C. chlorophyll

D. ATP

E. photosystem II

This diagram is a representation of the light reactions. (1 pt)

gas exchange

7. The function of the stomata is: (1 pt)

-1 structural & to accommodate the light independent or dark reactions

8. The cells that control the opening and closing of the stomata are called: (1 pt)  
guard cells

9. Where are stomata usually found on the leaf and when are they usually open? (2 pts)

-1 on the ~~shade side~~ lower epidermis in the cool part of the day - evening

10. Photosynthesis usually takes place in the chloroplasts of the upper parenchyma and the lower parenchyma in the mesophyll of the leaf. (2 pts)

11. ~~MM~~ F The blue-green color which separated out onto the chromatography paper corresponded with the carotenoid pigments in the leaf sample. (1 pt)

12. What is the name of the instrument that we will be using today to determine oxygen consumption? (1 pt)

-1 ~~metabolic~~  
~~metabolic~~  
cardiac meter

1. Cheating is unacceptable behavior. Any student caught cheating will receive an automatic F in the course.
2. You are expected to be prepared for each lab by reading the exercise before you come to class. Quizzes may contain material pertaining to the exercise being performed that day.
3. You are responsible for information given in the class even if you are absent. See your instructor.
4. Every student must attend one field trip. Sign-up sheets will be posted outside Room MH-312 the third to fifth week of class. You must sign up during this period. Points will be deducted for failure to follow procedures - Consult your lab manual pp i - iv for specific details.
5. There shall be no make-up exams or quizzes unless cleared with the instructor.

Manette Horrocks

MH 289

BIOLOGY 101 LAB SCHEDULE  
FALL 1987

Office M: 1:30-2:30  
T: 3-4

WEEK OF: Biological Activity

x 3614

Aug. 31 Introduction and Orientation  
Living World (Ex. IA)  
Metrics (Ex. IB)\*

Sept. 7 LABOR DAY: NO LABS ON MONDAY  
Microscopes (Ex. II)  
Examination of Microbes

11 Cell Membranes and Permeability (Ex. III)\*

21 Plant Diversity (Ex. IV)

28 Photosynthesis (Ex. V)\*

Oct. 5 Respiration (Ex. VI)\*

12 Animal Diversity - Invertebrates  
(Ex. VII, pp 71-83)

19 Animal Diversity - Invertebrates (pp. 83-90)  
- Vertebrates (Ex. VIII)

26 Vertebrate Anatomy (Ex. IX)

Nov. 2 Human Physiology (Ex. X)

9 Cell Division  
Embryology (Ex. XI)

16 Genetics (Ex. XII)

23 THANKSGIVING RECESS

30 Ecology (Ex. XIII)

Dec. 7 LAB FINAL EXAM

\*BRING CALCULATORS TO CLASS

GRADES:

Quizzes (11 @ 25 each)  
(Lowest quiz dropped)  
Practicum Exam  
Final Exam  
Field Trip and Report - i  
Instructor Evaluation

= 250

= 75

= 100 / 75 comprehensive

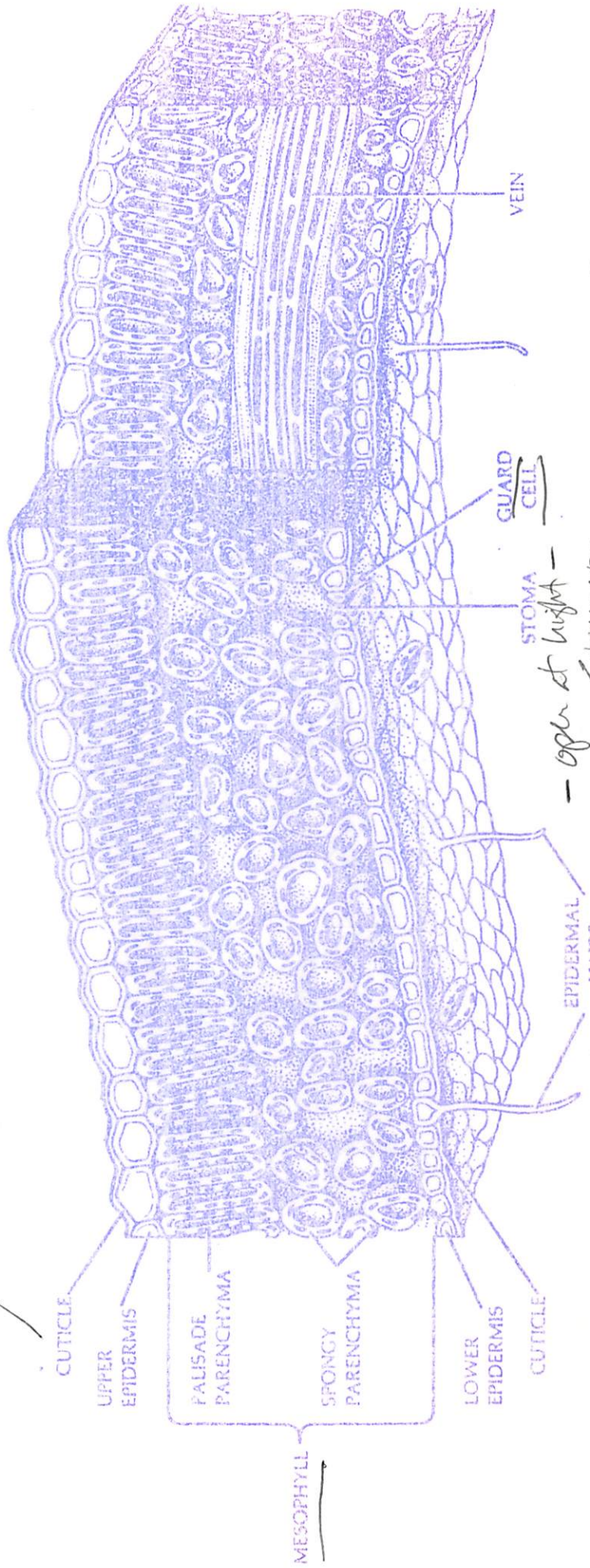
= 50

= (25) subjective

TOTAL

500

regulates water balance



- open at night -

high turgor pressure (water) on guard cells - stomata open  
low pressure - stomata close.

STOMATA underside of the leaf - takes in carbon dioxide - releases oxygen & water vapor - control water loss

LOCATION: TUCKER WILDLIFE SANCTUARY

DATE: 10/24

TIME / MEETING PLACE: Meet in Tucker' parking lot at 10<sup>00</sup> Am.

DIRECTIONS: From CSUF, take the 57 Frwy south to 91 Frwy east to the 55 Frwy south. Get off at Chapman Ave "East". Follow Chapman to Santiago Canyon Road and turn right. Modjeska Canyon Road is about 11 miles from there. Turn left onto Modjeska Canyon Road. Just after crossing the bridge, there is a tree in the middle of the road. Go around the tree to the left and continue slowly up the canyon. ALLOW APPROXIMATELY 45 MINUTES TRAVELLING TIME.

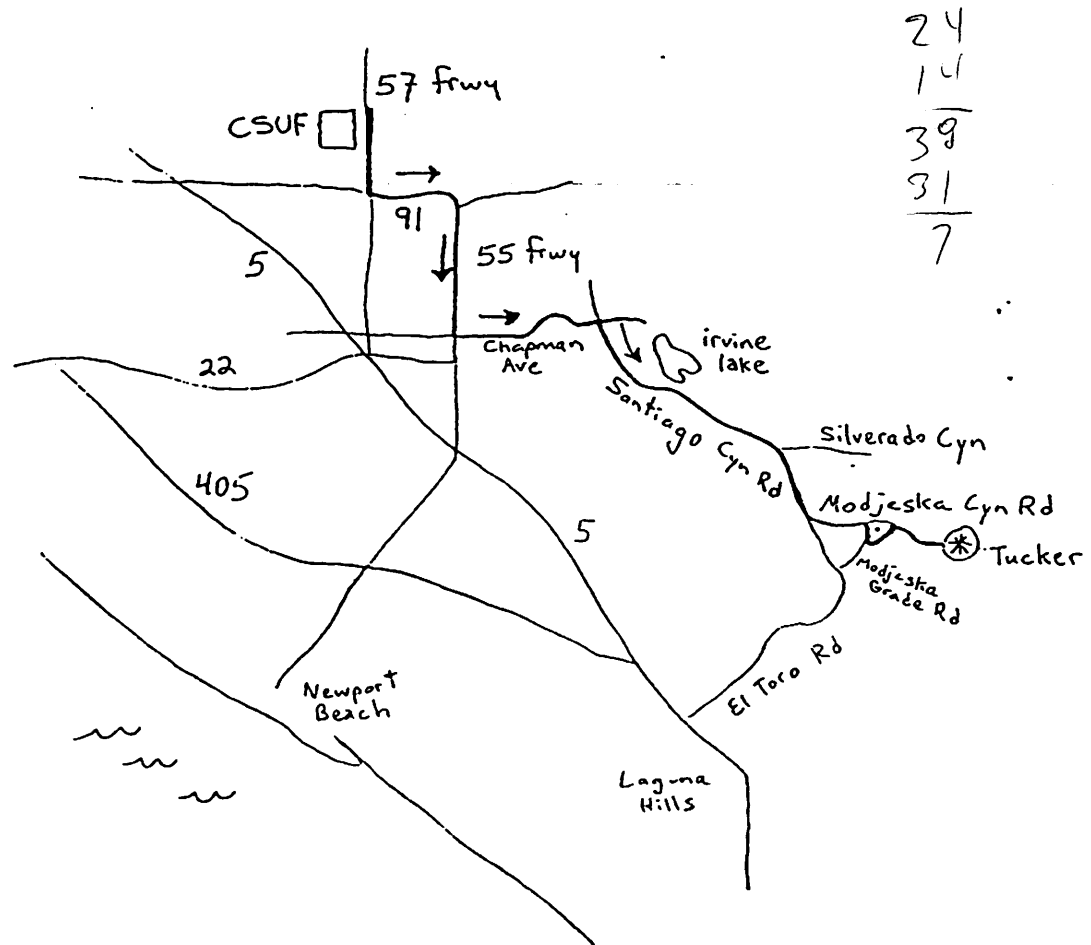
Be Careful - almost a U-Turn. → \*

WHAT TO BRING / COST / ADDITIONAL INFORMATION:

1. Wear comfortable walking shoes.
2. Optional: binoculars
3. Donation voluntary.
4. If field trip involves a hike, bring WATER.

TRIP LEADER:

PURPOSE: To learn about the chaparral habitat. Plant and animal inhabitants, plant and animal adaptations, importance of fire, and north-south slope effect will be discussed. Also do some bird watching.



24  
14  
39  
31  
7



17 1/2

1. Structure d is most likely a protein (1 pt.)
2. True/False Structure b will probably be soluble in mineral oil. (1 pt.)
3. Structure c is a phospholipid. (1 pt.)

4. Since the cell membrane allows some materials to pass through freely, while restricting others, it is said to be selectively permeable (1 pt.)

5. What are some of the factors affecting the rate of diffusion? (4 pts.)

thermal ~~temperature~~ level of molecules, concentration of solutes, size of the molecules,

6.



Indicate with an arrow which way the water will move through the cell. (1 pt.)

What kind of diffusion is this? (1 pt.)

**osmosis**

7. The model that biologists have developed for the cell membrane is called the lipid ~~fluid~~ mosaic model. (1 pt.)

8. Define facilitated diffusion. (2 pts.)

the movement of solutes from a greater level of concentration protein carriers to a lesser level of concentration

9. Define active transport. (2 pts.)

the movement of ~~solute~~ molecules by means of metabolic energy from a level of lesser concentration to greater concentration

10. Joe Student observed the following red blood cells under the microscope.

Label each slide according to the type of environment each cell is in. (3 pts.)

Slide

Side View of Cell

A.



A. hypotonic

B.



B. isotonic

C.



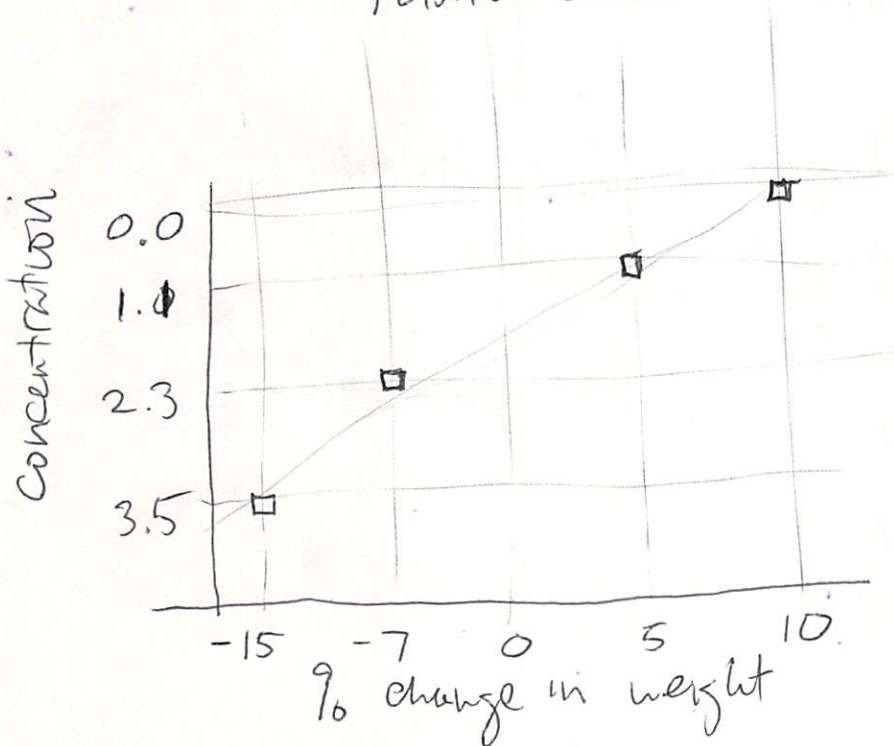
C. hypertonic

11. Referring to the previous diagram, what has happened to the cell on slide C?  
(Hint: what is the process called?) (1 pt.) *fluid within the cell has moved out of the cell into the surrounding regions - the cell has crenated.*
12. In terms of water solubility, the phosphate group of the phospholipid is said to be water soluble hydrophilic whereas the lipid portion is said to be oil soluble hydrophobic (2 pts)

13. The following data were obtained from the potato lab. Graph the data, label where necessary, and find the isotonic concentration of the potato. (3 pts)

Concentration	% change in weight
3.5 %	-15 %
2.3 %	-7 %
1.1 %	5 %
0.0 %	10 %

POTATO CHANGE IN WEIGHT



ISOTONIC CONCENTRATION  
APPROX = 1.5 %

14. Name one Division (or Phylum) of plants that we will be learning about today. (1 pt.)

*brown algae*

1. What factors (or structures) allowed plants to invade dry land? (2 pts.)

① development of a vascular system, means of getting needed water & nutrients. ② the development of the seed (water not needed for reproduction) ③ structure of the stem to support leaves.

2. In tracheophytes the sporophyte generation is dominant, whereas in bryophytes the gametophyte generation is dominant. (2 pts.)

3. Define xylem and phloem. What group of plants have this type of tissue? (3 pts.)  
Xylem & phloem are parts of the plants vascular system. Root system the way by which it distributes water & nutrients to the cells & also how which does which?

4. Name the major characteristics of monocot plants. (4 pts.)  
one leaf in the embryo  
leaf venation is parallel  
root structure is spread out (no tap root)  
types of plants?  
flower parts in 3's

5. Name the major characteristics of dicot plants. (4 pts.)  
two leaves in the embryo  
leaf venation is netlike  
Root system is tap root  
flower parts 4's & 5's

6. Choose one house in the greenhouse (lath, cactus, orchid) and describe its characteristics. Name 3 plants you saw in that house. (2 pts.)

7. The female part of the flower is called the pistil and is made up of the ovary, and style. (2 pts.)

8. Define sori. What is the common name for the plants on which they are found? (1 pt.)

9. Matching. Match the characteristics to the proper plant group. (5 pts.)

3 Rhodophyta  
(Red Algae)

4 Gymnospermae

5 Chlorophyta  
(Green Algae)

2 Angiospermae

1 Bryophyta

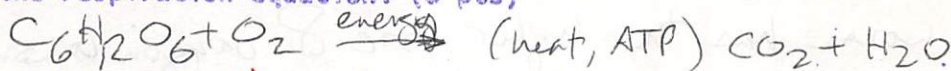
1. Do not have a vascular system, require water for fertilization, most primitive of the land plants, grow in moist regions.
2. Flower-bearing plants, this group contains the majority of terrestrial plants.
3. Occur deep in the sea water, some have encrustment of calcium carbonate, contain accessory pigments called phycobilins.
4. Male and female gametes borne on cones, usually evergreen with needle-like leaves.
5. Usually fresh water, multicellular and unicellular, may live in colonies, higher plants may have evolved from these.
6. Usually marine, contain accessory pigments called xanthophylls, attached to rocks by holdfasts, have air filled floats.
7. Equisetum is only genus left on earth, strengthened with silica, have underground stems called rhizomes.

6. a. Leaves pinnately compound with 3-15 leaflets.....7  
 b. Leaves palmately compound with seven leaflets, trunk covered with spines..... Chorisia (Floss Silk Tree)
7. a. Leaves with 3 leaflets..... Erythrina (Coral Tree)  
 b. Leaves with 11-15 leaflets ..... Harpephyllum (Kafir-Plum)
8. a. Leaf margins not toothed or lobed.....9  
 b. Leaves distinctly 2 lobed..... Bauhinia (Orchid Tree)
9. a. Leaves small (5 cm wide).....10  
 b. Leaves larger (7-15 cm wide), dark, glossy green above and often covered with rusty hairs beneath..... Magnolia.
10. a. Leaves less than 2.5 cm wide, scented..... Eucalyptus  
 b. Leaf blades 2.5-5 cm wide, glossy dark green above, paler below, margins undulate..... Pittosporum

ANSWER SHEET

- Plant #1 = Washington (Caf. Tree plum)  
 Plant #2 = Yucca  
 Plant #3 = Hamamelis (Hamamelis)  
 Plant #4 = Bauhinia (Orchid Tree)  
 Plant #5 = Pinus (Pine)  
 Plant #6 = Pittosporum  
 Plant #7 = Harpephyllum (Kafir-plum) Erythrina (Coral Tree)  
 Plant #8 = Eucalyptus  
 Plant #9 = Kafir Plum  
 Plant #10 = Magnolia  
 Plant #11 = Floss Silk Tree

1. What is the respiration equation? (3 pts)



2. T/F Anaerobic respiration requires oxygen. (1 pt)

3. Animals may be classified based on body temperature. Name the two categories of animals we discussed and give 3 characteristics of each category. (8 pts)

A. ECTOTHERMS

- low metabolic rate
- low or thin insulation of body
- body ~~functioning~~ heat or temperature derived from surrounding environment.
- behavioral regulation of body heat

B. ENDOTHERMS

- higher metabolic rate
- thicker or greater insulation of body by fur or fat or feathers
- body heat regulated internally through metabolic exchange

4. The rate of metabolism can be indirectly measured by measuring the rate of oxygen consumption. (1 pt)

5. In the respiration lab, Drierite was used to absorb CO<sub>2</sub>, whereas NaOH was used to absorb water vapor. (2 pts)

6. If a mouse weighs 20 grams and consumes 2cc of oxygen in 18 seconds, determine the number of cc O<sub>2</sub>/gm/hr the mouse uses. (2 pts)

Hint:  $cc\ O_2/gm/hr = \frac{1\ mouse}{20\ gm} \times \frac{2\ cc\ O_2}{18\ sec} \times \frac{3600\ sec}{1\ hr} = \frac{1}{20} \times \frac{2}{18} \times \frac{3600}{1} = 20$

Calories/gm/hr = (4.8 cal/cc) (cc O<sub>2</sub>/gm/hr)

Please Show Your Work:

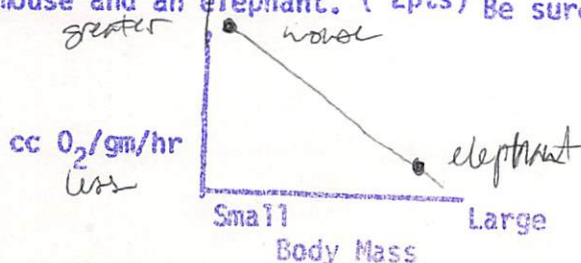
20 cc O<sub>2</sub>/gm/hr or 96.0 calories/gm/hr

$$\frac{1}{20} \times \frac{4800}{1} = 20 \times 20 = 400$$

$$\frac{4.8}{20} = 96.0$$

7. The instrument we used in the respiration lab was called a respirometer which consists of an animal chamber connected to a manometer. (2 pts)

8. Draw a weight specific metabolism graph (oxygen consumption relative to body size), comparing a mouse and an elephant. (2pts) Be sure to label the graph.



Oxygen Consumption w/ relation to Body Mass

15

9. Which has a higher rate of oxygen consumption relative to body size, an elephant or a mouse? Explain why. (3 pts)

~~OK~~ ~~the mouse has the higher rate of oxygen consumption. This is because the mouse has the greater ratio of body mass exposed to the environment with respect to the total body mass.~~  
The mouse has the higher rate of oxygen consumption. This is because the mouse has the greater ratio of body mass exposed to the environment with respect to the total body mass.

10. Name one phylum of animals we will be looking at today. (1 pt)

~~Archinids~~

## INTRODUCTION

The computer can be a useful tool in the biology laboratory. It can help in the analysis and graphing of data, run statistical tests (hypothesis testing to see if samples are significantly different), and help in running simulations and computer assisted instruction.

We DON'T expect you to become computer literate in this course. We DO expect you or someone in your group to know how to operate the computer in order to enter data. If something happens during the laboratory on the computer you do not understand, and you lack the experience to solve the problem...find someone who can help you. Knowledge about how to operate the computer should open up new possibilities for you in this course.

### The Computer System

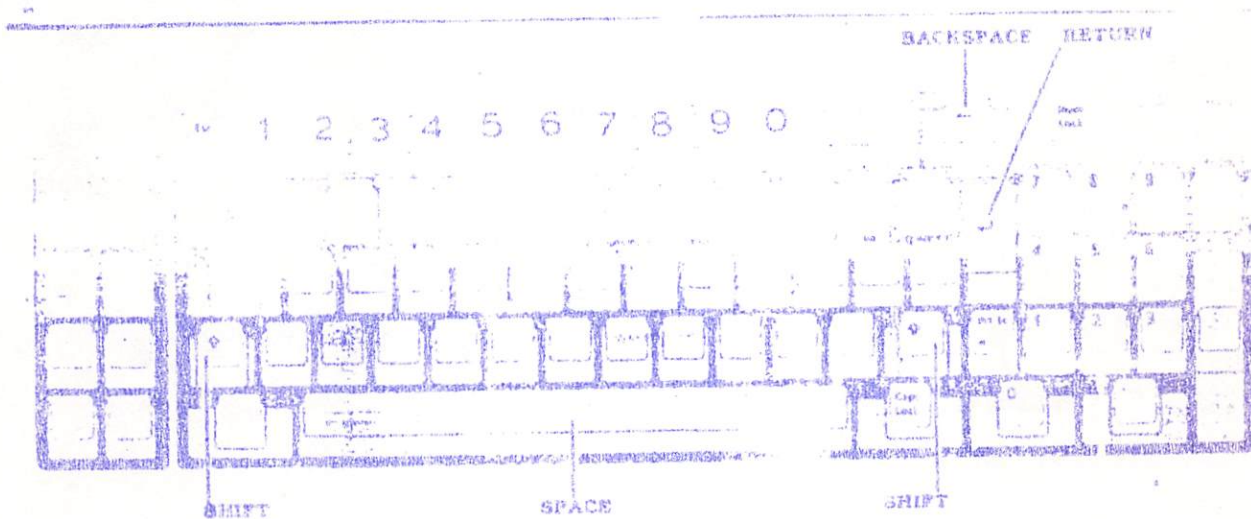
We have a 'clone'... 640K computer similar to the IBM system (MS-DOS). The computer has slots for 'floppy disks' which contain the program material. Disks are the lifeblood of the computer. We have BACKUPS of all disks in this class... so if a disk is damaged (as I'm sure will happen), it can be easily replaced. There will always be a disk for each laboratory. If your disk does not work, try the one next door. Your instructor knows how to insert the disks; once the computer, monitor, and printer are turned on, the program is automatically loaded into the computer. Most of the time, you will not need to handle the floppy disks.

Most programs in this class are menu-driven. This means the computer will ask you for information, check this information to see if it is correct (within a set range, a number or letter, etc.), and use it in the program. This error checking tends to slow down the programs, but we feel it is worth the inconvenience. Numbers can be entered with the top row of keys, or, if the 'NUM LOCK' key is pressed (turning on the red key light), you can enter numbers on the number keyboard on the right of the keyboard. There are only a few keys that may be unfamiliar to you which must be learned (SEE THE FIGURE). First the 'RETURN' key should usually be pressed after entering data. If a mistake is made, the backspace key will delete the letters typed. Two other keys will be used extensively during the laboratory. The (right) SHIFT KEY (arrow up) when pressed down at the same time as the PRISC key will print the screen contents on the printer. You can get 'hardcopy' of your results this way.

## Biology 101 Computer Manual

The 'output' of the computer is either on the computer screen (color monitor) or can be sent to the dot matrix printer. Make sure there is always paper for the printer. The printer is probably the weak link in our chain of machinery. It is the unit that will probably fail first....therefore treat it CAREFULLY. DO NOT ADVANCE THE PAPER BY THE KNOB ON THE RIGHT IF THE PRINTER IS ON!!! Instead, make sure the printer is 'off line' by pressing the appropriate button on the front of the unit, advance the paper either with the LF (line feed) button or the FF (form feed button) and then tear off the paper.

Note: For many programs, pressing ANY key will advance the program to the next screen. ONLY TOUCH THE COMPUTER'S KEYS WHEN YOU HAVE FINISHED READING A SCREEN/ENTERING DATA. (For your entertainment, when a disk is first booted it will show an example of computer graphics... that will be the only time you will see that program.)



RECEIVED BY THE DIRECTOR, FBI, 10/10/57

Species within a single genus appear very similar. This similarity not only extends to visible, anatomical characteristics, but to behavior patterns, developmental patterns, physiology, and DNA sequences. Non-structural chemicals (e.g. Ribosomal base sequences) also are similar. (ALL SPECIES WITHIN A PHYLUM SHARE COMMON CHARACTERS)

This exercise gives you a taste of determining relationships between individuals--in your case 6 non-living objects.

UNLIKE LIVING THINGS, THESE OBJECTS HAVE NO PARENTS AND NO PERSONAL HISTORIES. The relationships that you decide, therefore, will be artificial but the tools you will be introduced to are powerful.

# REPORT

**DRAW YOUR DEMOGRAPHIC BELOW**

[illegible]

ITEM	CIRCULAR X-SECTION?	ANY THREADS?	DOES IT HAVE A HEAD?	# PARTS	ALL METAL?	LENGTH	POINT
SCREW	1	1	1	1	1	22	1
PENCIL	Ø	Ø	Ø	4	Ø	5	Ø
NAIL	1	Ø	1	1	1	84	1
BOLT	1	1	1	2	1	1.91	1
FIN	1	Ø	1	2	1	5.33	1

YES = 1  
NO = 0

PRESENT = 1  
ABSENT = 0

PRESENT = 1  
ABSENT = 0

GIVE #

YES = 1  
NO = 0

NOW, FIND 2 INEM CHARACTERS

21.5

1. Name 2 important characteristics of eukaryotic cells (2 pts.).

membranes surrounding the nucleus  
membranes surrounding the organelles

2. Define: (2 pts.)

Autotroph - organisms with the capability of converting energy such as sunlight into carbohydrates - ~~eg.~~ eg. photosynthesis & plants  
Heterotroph - ~~organisms~~ <sup>organisms</sup> that feed on other organisms to produce ~~energy~~ <sup>nutrients</sup>

3. Name one beneficial and one detrimental impact microorganisms have on humans. (2 pts.)  
(beneficial) bacteria in the intestinal region to aid in breaking down food particles  
(detrimental) ~~waterborne and contracted from mosquitoes~~

4. Matching (5 pts.) Match the characteristics with the Kingdom.

- |   |                   |
|---|-------------------|
| <input checked="" type="checkbox"/> a) Eukaryotic, algae and protozoans                         | <u>C</u> Monera   |
| <input checked="" type="checkbox"/> b) Eukaryotic, multicellular, vertebrates and invertebrates | <u>A</u> Protista |
| <input checked="" type="checkbox"/> c) Prokaryotic, unicellular                                 | <u>E</u> Fungi    |
| <input checked="" type="checkbox"/> d) Eukaryotic, autotrophic, chloroplasts                    | <u>B</u> Animalia |
| <input checked="" type="checkbox"/> e) Eukaryotic, heterotrophic, yeasts                        | <u>D</u> Plantae  |

Detrimental: the  
hansen virus  
contracted through  
a mosquito sting

5. How many liters would a 13 gallon gas tank hold? (Hint: 1 quart = 0.946 liters) 2 pts.  
(Show your work)

$$\begin{array}{r} 13 \times 0.946 \\ 13 \times 0.946 \\ \underline{52} \quad \underline{1872} \\ 11898 \\ 118980 \end{array}$$
  
47.672 Liters

6. For the next two questions, refer to your graph on page 14 of your lab manual. (2 pts.)

Who should live longer, a male or a female born in 1970? Female

What would you predict the life expectancy would be for a male born in 1977? 69

7. T or (F) Prokaryotic cells contain membrane-bound organelles. (1 pt.)

8. SDA is a greenish agar with a low pH that promotes the growth of bacteria fungi

-2 whereas NA is a yellowish agar with a higher pH that promotes the growth of bacteria

9. Biologists classify organisms into a hierarchical classification system. Name the categories, in order, from the most broad to the most specific. (2 pts.)

Kingdom, Phylum, Class, Order, Family, Genus, Species

10. Write the following scientific name in the correct manner: acer rubrum (2 pts.)

Acer rubrum

11. Give one characteristic of prokaryotic cells and give an example of a prokaryotic organism. (2 pts.)  
prokaryotic cells have no membranes defining a nucleus ex - bacteria

12. Name one type of cell we will be observing in today's lab. (1 pt.)

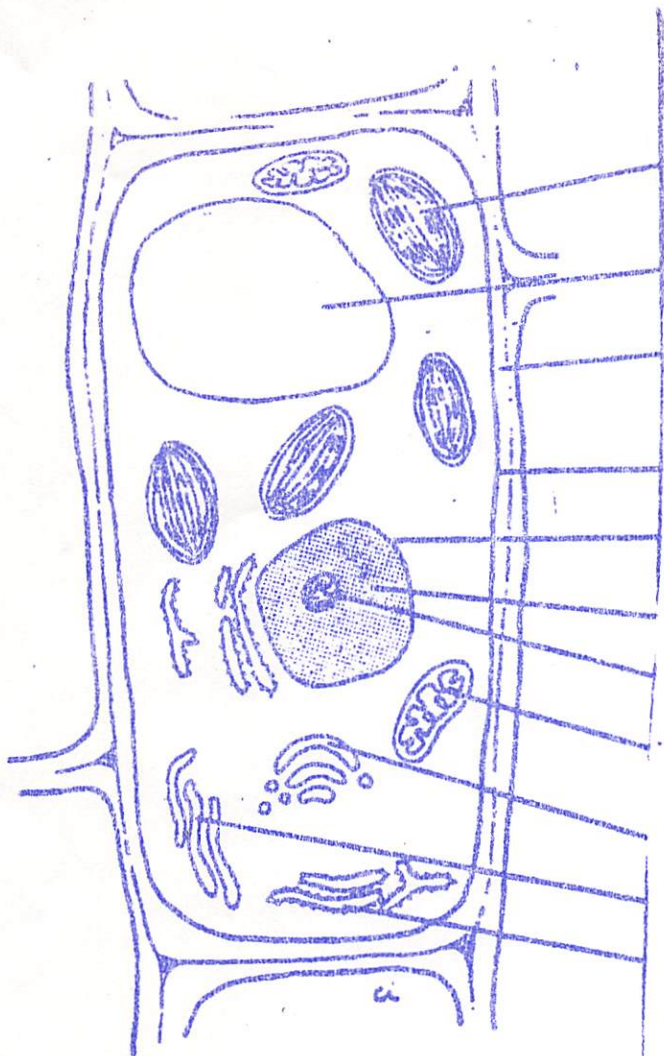
-1 what? pedicels



- adjusting the stage - smaller move-  
new  
large movement

Compound

3. Label each cell structure. (1 pt each)



A. chloroplast

B. Vacuole

C. cell wall

D. nucleus

4. What kind of cell is this? (1 pt)

plant cell

5. If you have an ocular with a magnification of 10x and an objective lens with a magnification of 43x, what is the total magnification? (1 pt)

430x

6. Why should you generally use the lowest power of the microscope when first viewing an object? (1 pt)

To get the big picture - view larger area of the slide to locate areas for further study

7. What is the "resolution" of a microscope? (1 pt)

resolution is the least <sup>distance</sup> ~~power~~ at which two points can be identified as 2 points

8. What are the steps involved in making a wet mount? (Be specific) (3 pts)

$\frac{1}{2}$  place solution on slide - place specimen in solution, place slide over solution one corner at a time <sup>drop slide at an angle</sup>

10. Name a specific type of cell we will be using in today's lab. (1 pt)

animal cell (blood cell)

①

9/1 Biol 101 - L

Life cellular level

system

organism

classification

physiological  
behavioral

organisms - one or another cells

prokaryotic

prokaryotic cells - unicellular

genetic material not contained w/

membrane -

organelles

organisms

eg:

bacteria

blue green  
algae

true nuclear

eukaryotic -

membrane bound nuke - DNA

organelles

protists

fungi

Autotroph - self-feeding  
synthesis - light to energy

eg - plants photo-

Heterotroph - feed on others either Aut. or Hetero.

(2)

## classification

Kingdom Phylum Class Order Family Genus Species

Animalia  
Cordata  
Mammalia  
Primates  
~~Homidae~~  
Homo  
Sapiens

King Phylum Class Order Family Genus Species

Kingdom (5)

Monera - unicellular - prokaryotic  $\left\{ \begin{array}{l} \text{auto} \\ \text{hetero} \end{array} \right\}$  trophic  
eg. Bacteria / Cyanobacteria / Algae

Protista - unicellular - eukaryotic  $\left\{ \begin{array}{l} \text{auto} \\ \text{hetero} \end{array} \right\}$  trophic  
eg. algae, protozoans

Fungi -  $\left\{ \begin{array}{l} \text{uni} \\ \text{multi} \end{array} \right\}$  cellular - eukaryotic - heterotrophic  
mould

Plantae - multicellular - eukaryotic & heterotrophic  
cell surrounded by cell wall  
small organelles - chloroplast - photosynthesis.  
energy production.

(3)

Amoeba - multicellular - eukaryotic - heterotrophic.

Micro

- sick, spoil food  
- ~~important~~ in everything -

Anger

SDA

- greenish  
- low pH (4)  
- provides good E. purg

NA -

yellowish color

---

metric system - (vs English eg inch/yards)

8

sub units  
meter

deci - $\frac{1}{10}$	deka - 10
centi - $\frac{1}{100}$	hecto - 100
milli - $\frac{1}{1000}$	kilo - 1000

1 inch = 2.54 centimeters	$^{\circ}\text{F} = \frac{9}{5}^{\circ}\text{C} + 32$
2.2 lbs = 1 kilogram	$^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32)$
1 quart = .946 liter	

? cm = 5 inches

(4)

$$\begin{aligned} ? \text{ lbs} &= 50 \text{ kilograms} \\ &= 50 \text{ kg} \left( \frac{2.2 \text{ lb}}{1 \text{ kg}} \right) \end{aligned}$$

---

## Computer - Biology Application

---

### Dichotomist Key

- ① prokaryotic ?  $\rightarrow$  prokaryote  $\begin{cases} \text{autotrophic} - \text{bluegreen algae} \\ \text{heterotrophic} - \text{bacteria} \end{cases}$
- ② cell surrounded by cell wall  $\rightarrow$  Animalia - heterotrophic
- ③ contains chloroplasts  $\rightarrow$  Plantae - autotrophic  
no  $\rightarrow$  FUNGI - heterotrophic

compound microscope = objective/ocular lens  
dissecting " = large magnifying glass  
objective lens = lower (more powerful) lens  
high power = high magnification strength  
" " " lower " " "

ocular lens = eye piece

iris diaphragm = selects light strength

condenser = directs light beam

fine adjustment = small knob - raise/lower plate

coarse " = larger " " " "

magnification = power to enlarge an object =

resolution = smallest power by which two points  
can still be distinguished as two points.

nucleus = portion of the cell containing the  
cell's genetic information

plasma membrane - cell "body"

cytoplasm

cell wall the boundary between the cell &  
the world outside

chloroplast = photosynthesis  
methyl blue stain.

Bio - LAB

Resolution - how fine a detail the microscope will reveal - very smallest distance where 2 points could be seen as 2 points

magnification - how many times an object is magnified -  
power of eye piece  $\times$  power of objective lens  
(10x) (10x) = 100x

<u>known parts</u>		
objective lens	3.5	(oil immersion lens)
	10x	
	43x	

wet mount

compound / dissecting

- wet mount -  
- green/stuff  
-

slides

(1)

2/15

all membrane - regulates  $\text{I/O}$   
maintains  $\text{I/O}$  bal:  
nutrient in / wastes out

Fluid mosaic

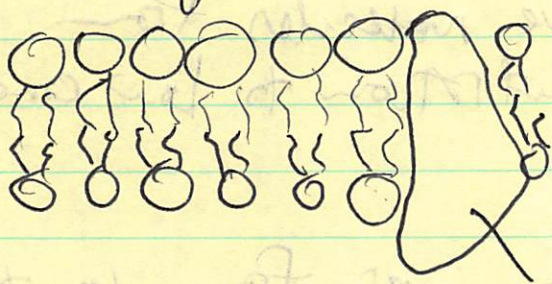
cell membrane = bi-layer of phospholipids  
w/ associated proteins

phospholipid  $\rightarrow$  type of molecule -

phosphate  
polar (charged)  
able to interact  
w/ water  
hydrophilic

Bi-layer

outside cell  $\text{H}_2\text{O}$



lipid - fat - non-polar

(no charge) don't like water  
hydrophobic

inside cell protein - involved in  $\text{I/O}$  - carriers

2 types of movement - passive -  
active -

Passive (no energy) (1) simple diffusion  
~~solutes~~ move from high concentration to low  
solutes

(2)

concentration.

- move down a concentration gradient.

(2) osmosis - water

movement of water from high concentration to low concentration across a selectively permeable membrane - cell membrane

things that affect the rate of diffusion

- (1) Thermal activity of molecules
- (2) magnitude of the concentration gradient
- (3) size of the molecules
- (4) lipid solubility of molecules

(3) Facilitated Diffusion

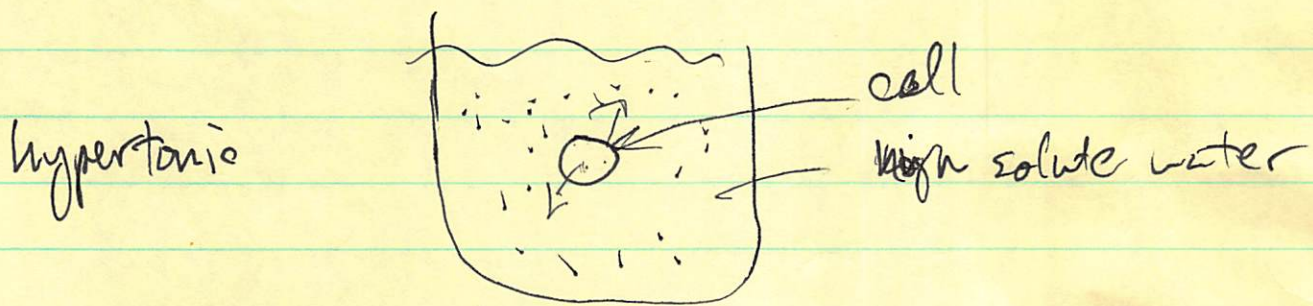
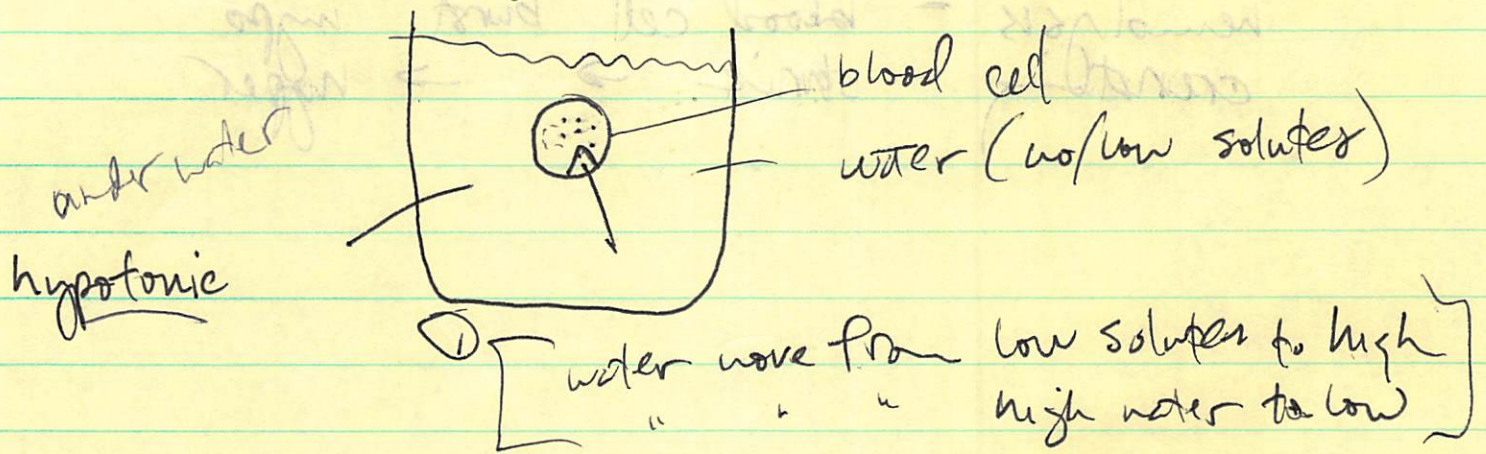
protein carriers move molecules from region of high concentration to low concentration

Active Transport

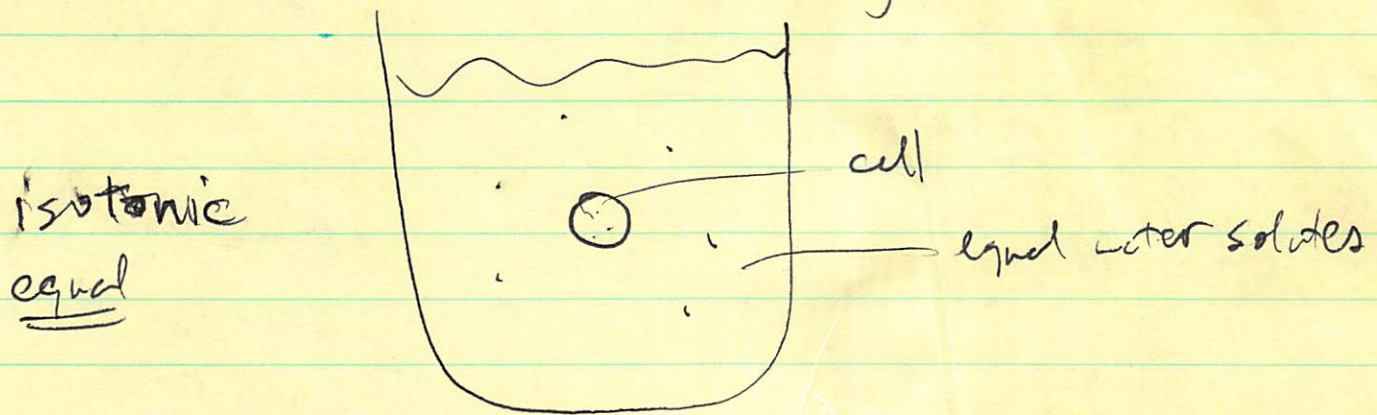
- (requires energy - moving from low to high areas of concentration)
- protein carriers

③

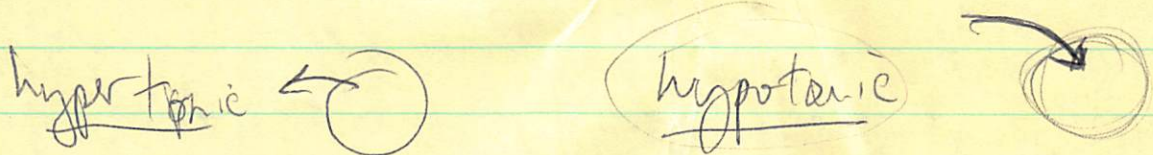
cell affected by environment -



water move from cell to surrounding solution



no movement



④

hemolysis - blood cell burst  
crystal - shrink → → hypo  
hyper

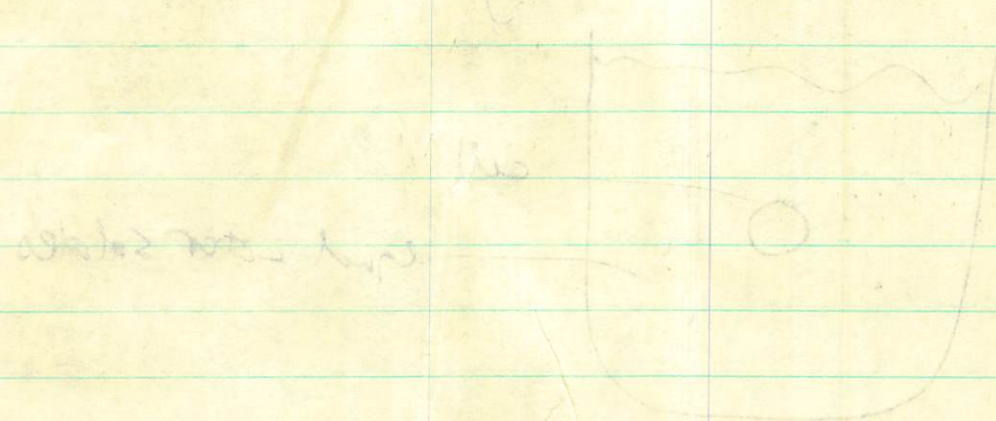
1. In a hypertonic solution, water moves out of the cell, causing it to shrink.

hypertonic



hypertonic

2. In an isotonic solution, water moves in and out of the cell at equal rates, and the cell maintains its normal shape.



isotonic

hypo



hypotonic

9/02

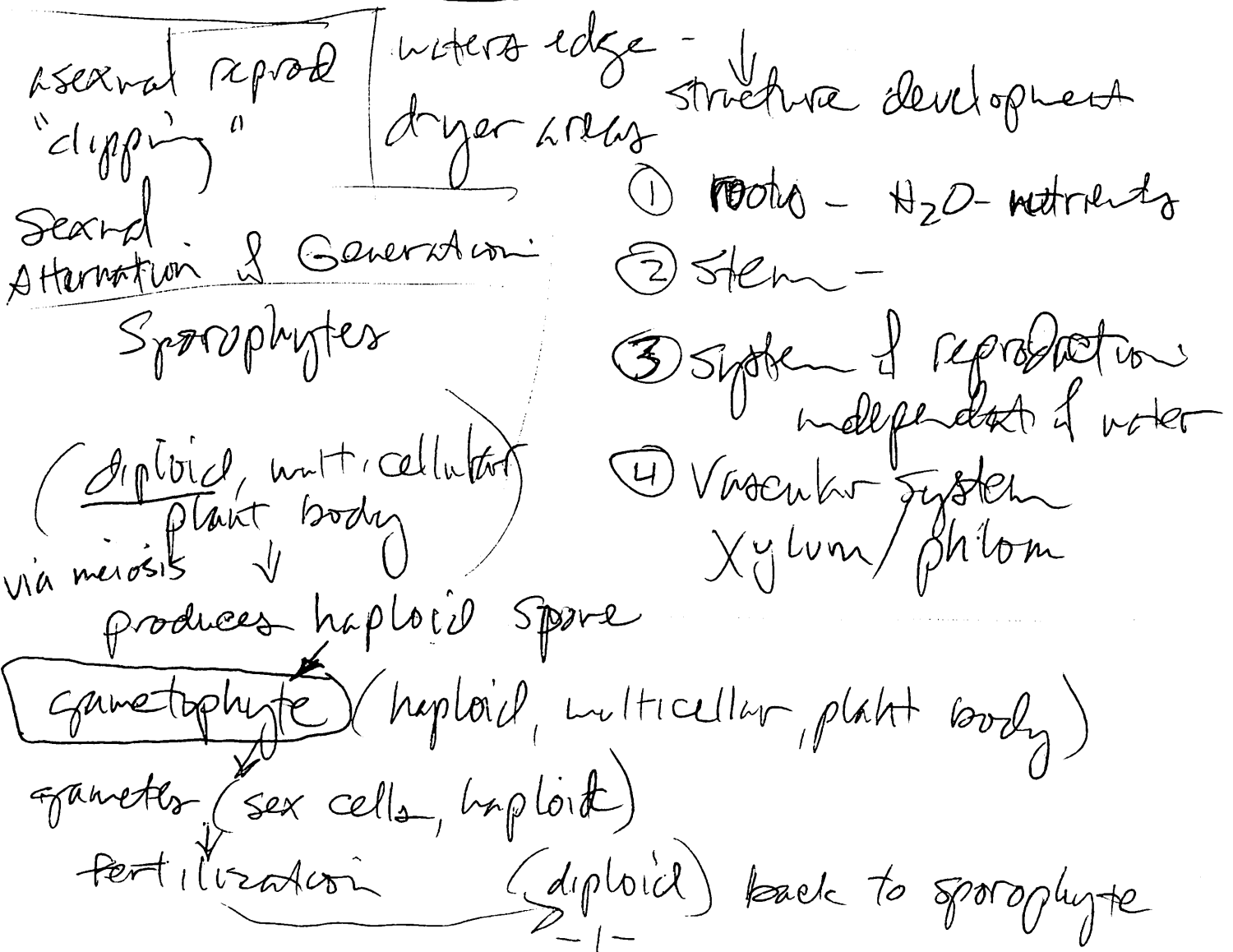
Tucker Wildlife Reserve - Oct 24 - 10<sup>00</sup> AM

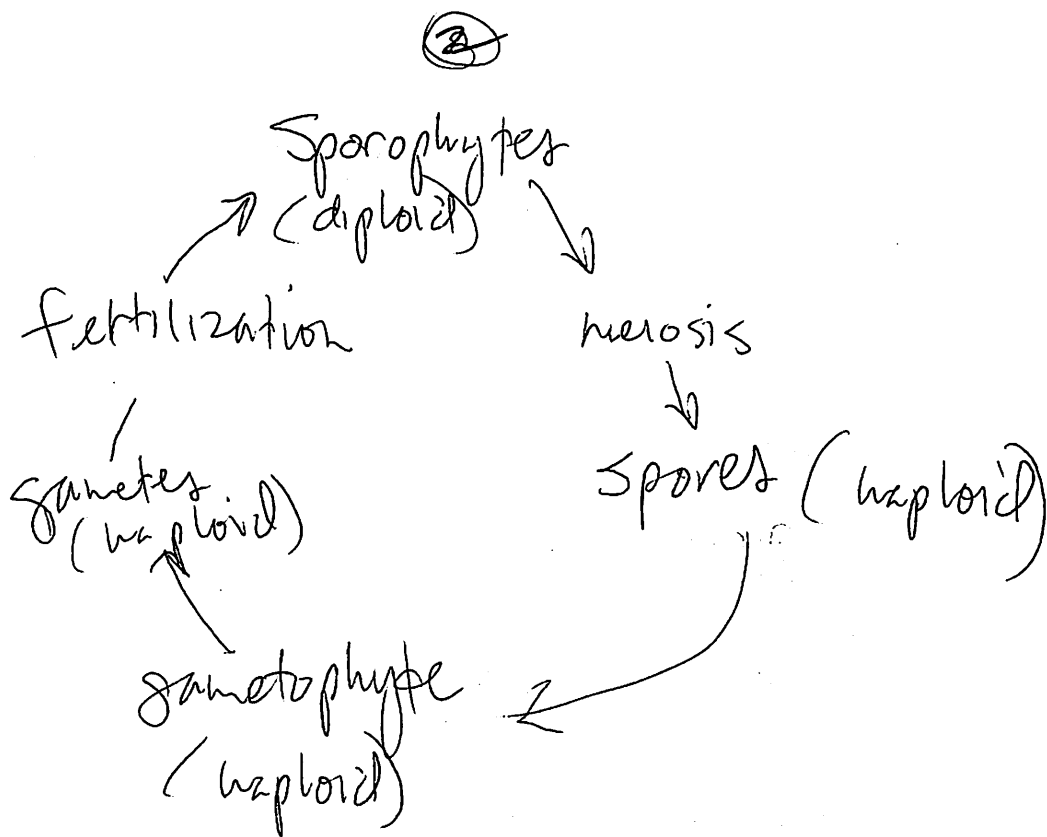
(1st)

- ① The Algae
- ② The Bryophytes
- Tracheophytes

p. 42

evolution - water - sit in it






---

[Red Algae] ~~Rhodophyta~~ (Rhodophyta) p. 39  
 marine/ accessory pigments - deep in the seawater eg-  
 phycoerythrin  
 - attached to rocks  
 - coralline algae  
 - used in milk/ice cream production -

---

Brown Algae (Phaeophyta)  
 marine eg. seaweed - kelp - large  
 accessory pigments → xanthophylls  
 attach to rocks by "hold-fast" - like roots.  
 Blade - ~~leaf~~ leaf like  
 Stipe - stem-like  
 Floats.

<sup>-3-</sup>  
Green Algae (Chlorophyta)

color = Chlorophyll.

land plants evolved from Green Algae

~~multicellular~~ or ~~unicellular~~ unicellular  
approaching specialization

---

land plants. (moss)

Bryophyta

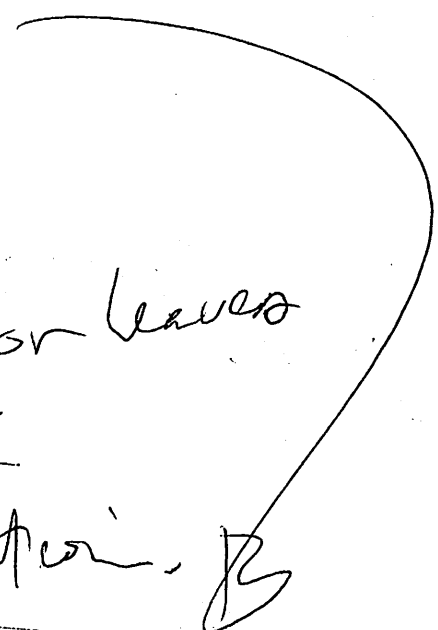
or Vascular.

mosses, liverworts,

hornwort (no ~~vascular~~ system)

no true stem roots ~~or~~ or leaves

need water to reproduce

gametophyte generation. 

---

Vascular

① sporophyte generation - diploid

② true roots, leaves & stems.

Xylem

(4)

3) Embryo develops in female

reproductive organs

4) wax: external cuticle  
- water balance

---

Primitive "vasculars"

Club mosses Lycopoda

Forest floors

partly dev. vascular tissue

---

horsetails (Sphenophyta)

① Equisetum

② Silica (

---

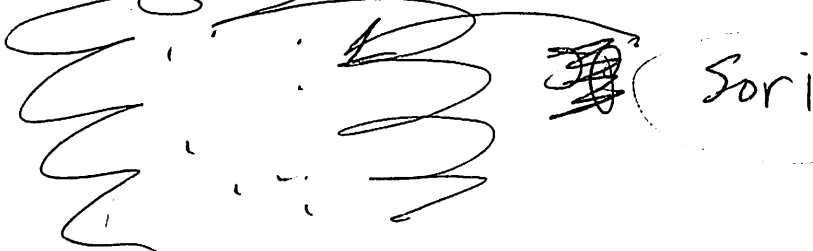
Fern (Pteropsida)

well dev. leaves - stem underground



looking at leaves

~~vascular~~ vascular system



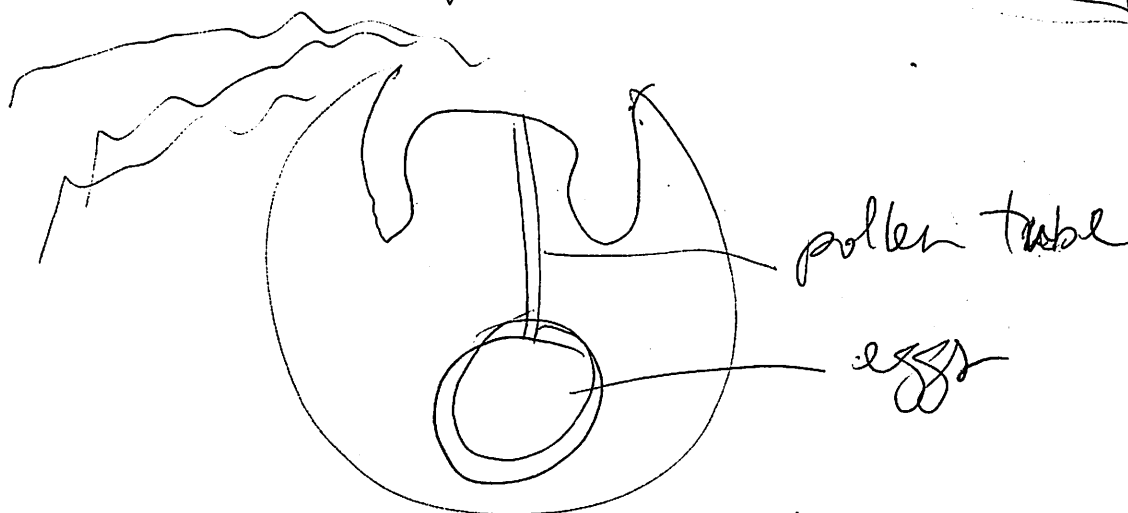
⑤  
Tracheophytes (division / phylum)

Gymnosperm [class]



conifers

|| ♂/♀ gametes on cones.  
|| wind pollination



evergreens — don't drop w/ leaves,

Angiosperm [class]

Flowering plants (~~angiosperms~~)

Subclasses

monocots

- one cotyledon (embryonic leaf)
- flower part multiples of three (3, 6, 9)  
petals, stamens etc.
- leaf venation = parallel

⑥

~~fibrous~~ fibrous root system

eg. grasses, corn, onions etc

---

Dicots [subclass]

two

- flower parts 4 or 5
- leaf venation - netlike
- root system = tap root

---

Plant Anatomy p. 46